

# Virginia Ambient Air Monitoring 2001 Data Report



Department of Environmental Quality

Commonwealth of Virginia  
Department of Environmental Quality



Submitted by  
Office of Air Quality Assessment

This Ambient Air Monitoring Data Report is for the time period of  
January 1, 2001 to December 31, 2001

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Department of Environmental Quality

John M. Daniel, Director  
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2001 Annual Report prepared by:  
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**Acknowledgments:**

Thanks to John M. Daniel, James Dinh, Carolyn Stevens, Charles King,  
Tom Jennings and Dan Salkovitz.

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### **CERTIFICATION**

Air quality data reported by the Virginia Department of Environmental Quality are collected using EPA certified equipment and procedures at sites meeting EPA siting criteria. The data summarized in this report for calendar year 2001 are accurate to the best of my knowledge.

  
John M. Daniel, Jr., P.E., DEE  
Director, Air Program Coordination



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15 May 2002

### CERTIFICATION

The Fairfax County Air Quality Monitoring Program's portion of the air quality data reported by the Virginia Department of Environmental Quality was collected using EPA certified equipment and procedures at sites meeting EPA siting criteria. The data summarized in this report for calendar year 2001 are accurate to the best of my knowledge.

Glenn Smith  
Program Manager



*City of Alexandria, Virginia*

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CERTIFICATION

That portion of the Virginia air quality data collected by the City of Alexandria Transportation and Environmental Services Division of Environmental Quality are collected using EPA certified equipment and procedures at sites meeting EPA siting criteria. The data submitted and summarized in this report for calendar year 2001 are accurate to the best of my knowledge.

May 7, 2001

*Ken Whitlock*

Ken Whitlock  
Environmental Specialist  
Division of Environmental Quality  
City of Alexandria Transportation &  
Environmental Services

## **ABBREVIATION TABLE**

<b>#N</b>	Number of Samples
<b>AQA</b>	Air Quality Assessment
<b>AQCR</b>	Air Quality Control Region
<b>ARITH.</b>	Arithmetic
<b>ATMN</b>	Air Toxics Monitoring Network
<b>CAS RN (CM)</b>	Chemical Abstracts Service Registered Number Continuous Monitor
<b>CO</b>	Carbon Monoxide
<b>CONC</b>	Concentrations
<b>DEQ</b>	Department of Environmental Quality
<b>DISC</b>	Discontinued
<b>EPA</b>	Environmental Protection Agency
<b>GC/MSD</b>	Gas Chromatograph/Mass Spectrometry Detector
<b>GC/FID</b>	Gas Chromatograph/Flame Ionization Detector
<b>IMPROVE</b>	Interagency Monitoring of Protected Visual Environments
<b>LAT</b>	Latitude
<b>LONG</b>	Longitude
<b>Met.</b>	Meteorological Instrumentation
<b>MSA</b>	Metropolitan Statistical Area
<b>NA</b>	Not Available
<b>NAAQS</b>	National Ambient Air Quality Standards
<b>NAMS</b>	National Air Monitoring Station(s)
<b>NMOC</b>	Non-Methane Organic Compounds
<b>NO<sub>2</sub></b>	Nitrogen Dioxide
<b>NQA</b>	Not Quality Assured
<b>OBS.</b>	Observations
<b>O<sub>3</sub></b>	Ozone
<b>PAMHC</b>	Total PAMS Hydrocarbon
<b>PAMS</b>	Photochemical Assessment Monitoring Station
<b>PM<sub>10</sub></b>	Particulate Matter with an aerodynamic diameter less than or equal to 10 microns
<b>PM<sub>2.5</sub></b>	Particulate Matter with an aerodynamic diameter less than or equal to 2.5 microns
<b>POLLUT.</b>	Pollutant
<b>ppbC</b>	Part Per Billion of Carbon
<b>ppbv</b>	Part Per Billion of Volume
<b>ppm</b>	Part Per Million
<b>SEC.STD.</b>	Secondary Standard
<b>SLAMS</b>	State and Local Air Monitoring Station(s)
<b>SO<sub>2</sub></b>	Sulfur Dioxide
<b>SPM</b>	Special Purpose Monitor
<b>STD</b>	Standard
<b>STDev</b>	Standard Deviation
<b>TERM</b>	Terminated
<b>TNMOC</b>	Total Nonmethane Organic Compound
<b>ug/m<sub>3</sub></b>	Micrograms per cubic meter
<b>VOC</b>	Volatile Organic Compounds

## INTRODUCTION

The 2001 Virginia Ambient Air Monitoring Data Report is a compilation of air pollutant measurements made by the Virginia Department of Environmental Quality, the City of Alexandria, and Fairfax County. This report satisfies the requirements of the U.S. Environmental Protection Agency (EPA) for the reporting of air quality data as specified in the Code of Federal Regulations, Title 40, Part 58, Appendix F.

Ambient air quality was measured at 53 locations within the Commonwealth during 2001. These monitoring sites were established in accordance with EPA's siting criteria contained in 40 CFR Part 58, Appendices D and E, and monitoring network operations conformed to EPA guidance documents and generally accepted air quality monitoring practices. All data reported for these monitoring sites were quality assured in accordance with requirements contained in 40 CFR Part 58, Appendix A.

Ambient concentrations of carbon monoxide, nitrogen dioxide, and sulfur dioxide continued to be within the EPA's national ambient air quality standards (NAAQS) in 2001. Ozone levels were slightly higher than in the previous year. In 2001, there were 22 days when one or more ozone monitoring stations in the state recorded eight-hour ozone averages above .08 ppm, and there were three stations that recorded a one-hour ozone concentration exceeding 0.12 ppm during the 2001 season.

2001 also marked the third year of operation of Virginia's PM<sub>2.5</sub> (fine particulate matter 2.5 micron and smaller) monitoring program. All of the twenty-three monitors at twenty locations were within the 24-hour standard during this three-year period. However, a final tally of averages will show that two areas of the state are in serious jeopardy of exceeding the annual arithmetic mean primary standard of 15 micrograms per cubic meter (averaged over a three-year period). These two areas are Bristol and Roanoke. Because of anticipated high values in these two cities, PM<sub>2.5</sub> speciation samplers were installed and began operation beside these PM<sub>2.5</sub> mass samplers in November of 2001. These additional monitors will give a "chemical fingerprint" of air masses moving through the respective areas. This data, in conjunction with data from other states, will give a representative picture of the constituents of the air samples, help identify sources of the high values, and show how the air masses move over a broad area.

On March 26, 2002, a federal appeals court ruling allowed EPA to proceed with the changes to the air quality standards for ozone and fine particulate matter that the EPA promulgated in July 1997. The new standards have been held up in court for five years, following challenges from industry and some states that believed the tougher standards were going to be too expensive to meet, and that EPA did not adequately justify the level of the standards. The case was heard by the U. S. Supreme Court, and in February 2001, the Court generally ruled in EPA's favor that the agency did not have to consider costs in setting ambient standards. However, the Court remanded the case back to the D. C. Circuit Court of Appeals and EPA to determine if the level of the standards chosen by EPA was arbitrary and capricious. The March 26 ruling disputed the charge that the level of the standards was arbitrary, and barring additional appeals, the EPA can go forward with the next phase of implementation of the new standards.

**AREAS IN VIRGINIA DESIGNATED AS  
NONATTAINMENT FOR THE 1-HOUR OZONE  
NATIONAL AMBIENT AIR QUALITY STANDARD  
(As of December, 1997)**

**Northern Virginia Ozone Nonattainment Area [serious]**

Arlington County	Alexandria City
Fairfax County	Fairfax City
Loudoun County	Falls Church City
Prince William County	Manassas City
Stafford County	Manassas Park City

The Richmond and Hampton Roads areas are in attainment with the 1-hour ozone standard. Both areas have maintenance plans in place to promote continued attainment of the standard.

All other areas of the Commonwealth are in attainment with the National Ambient Air Quality Standards.

**DATA CAPTURE CRITERIA**

<u>Minimum Number of Observations</u>	
<b>3-hour average</b>	<b>3 consecutive hourly observations</b>
<b>8-hour</b>	<b>6 hourly observations</b>
<b>24-hour</b>	<b>18 hourly observations</b>
<b>Quarterly averages (PM<sub>2.5</sub>, PM<sub>10</sub>)</b>	<b>75% of scheduled samples</b>
<b>Yearly averages (Continuous Instruments)</b>	<b>75% of total possible observations</b>
<b>Yearly averages (PM<sub>2.5</sub>, PM<sub>10</sub>)</b>	<b>Four complete quarterly averages</b>

## National Ambient Air Quality Standards

National Ambient Air Quality Standards (NAAQS), published by the Environmental Protection Agency (EPA) in connection with the Clean Air Act and 40 CFR, Part 50, are listed below.

On July 17, 1997, the EPA announced changes to the NAAQS for ozone and particulate matter. EPA is phasing out the 1-hour ozone standard, and replacing it with an 8-hour standard. For particulate matter, a standard for PM<sub>2.5</sub> has been added while retaining the PM<sub>10</sub> standard. EPA determined that these changes were necessary to protect public health and the environment. See introduction on page 5 for information regarding recent developments with the NAAQS.

POLLUANT	PRIMARY STANDARD		SECONDARY STANDARD	
	ug/m <sup>3</sup>	ppm	ug/m <sup>3</sup>	ppm
<b>CARBON MONOXIDE</b>				
8-hour concentration	10,000 <sup>a</sup>	9 <sup>a</sup>		
1-hour concentration	40,000 <sup>a</sup>	35 <sup>a</sup>		
<b>SULFUR DIOXIDE</b>				
Annual arithmetic mean	80	0.03		
24-hour concentration	365 <sup>a</sup>	0.14 <sup>a</sup>		
3-hour concentration			1300 <sup>a</sup>	0.50 <sup>a</sup>
<b>NITROGEN DIOXIDE</b>				
Annual arithmetic mean	100	0.053	Same as primary	
<b>OZONE</b>				
8-hour concentration	157 <sup>b</sup>	0.08 <sup>b</sup>	Same as primary	
1-hour concentration	235 <sup>c</sup>	0.12 <sup>c</sup>	Same as primary	
<b>LEAD</b>				
Quarterly arithmetic mean	1.5		Same as primary	
<b>PARTICULATE MATTER</b>				
<b>PM<sub>2.5</sub></b>				
Annual arithmetic mean	15 <sup>d</sup>		Same as primary	
24-hour concentration	65 <sup>e</sup>			
<b>PM<sub>10</sub></b>				
Annual arithmetic mean	50 <sup>d</sup>			
24-hour concentration	150 <sup>f</sup>			

<sup>a</sup> Not to be exceeded more than once a year

<sup>b</sup> 3-year average of the 4th highest 8-hour concentration may not exceed 0.08 ppm

<sup>c</sup> Areas in nonattainment with the 1-hour standard must meet that standard before demonstrating attainment with the 8-hour standard.

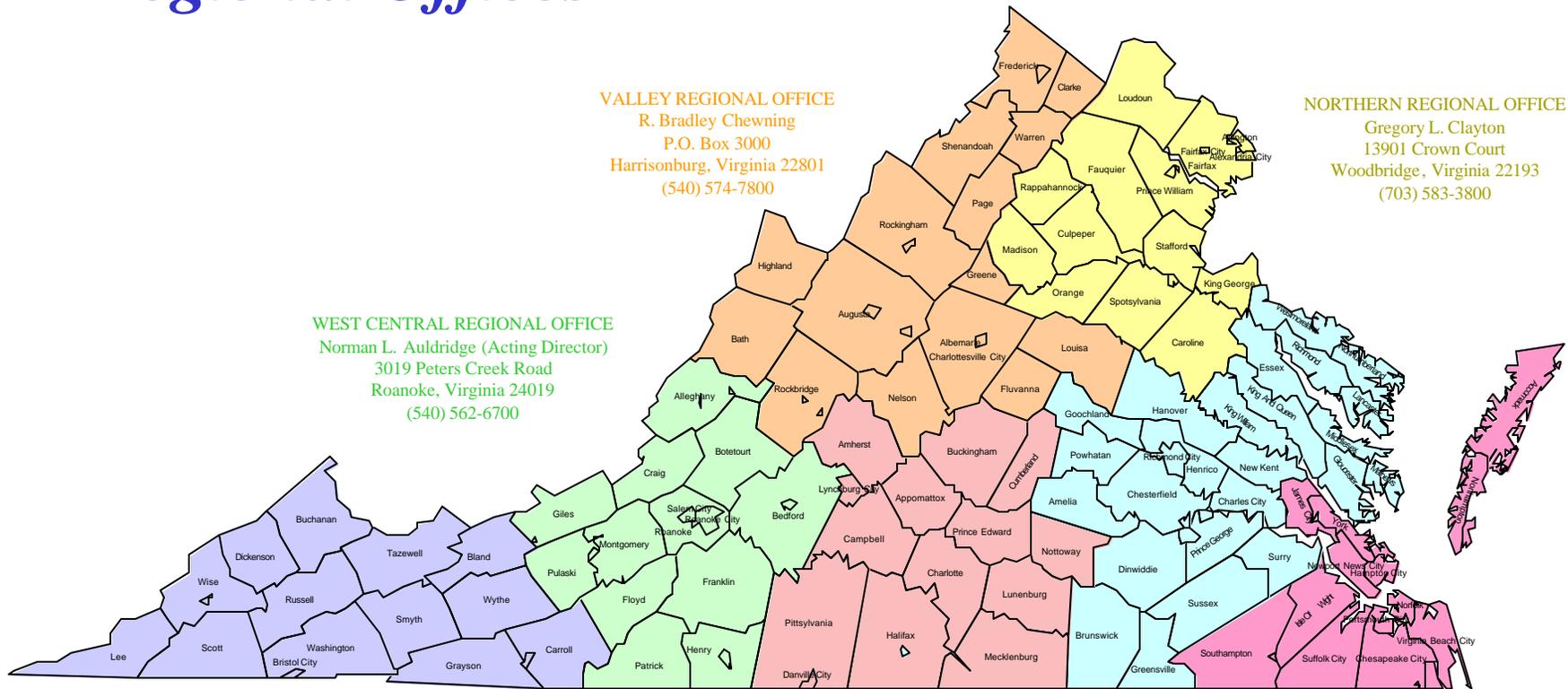
<sup>d</sup> Based on a 3-year average of annual averages

<sup>e</sup> Based on a 3-year average of annual 98th percentile values

<sup>f</sup> Based on a 3-year average of annual 99th percentile values

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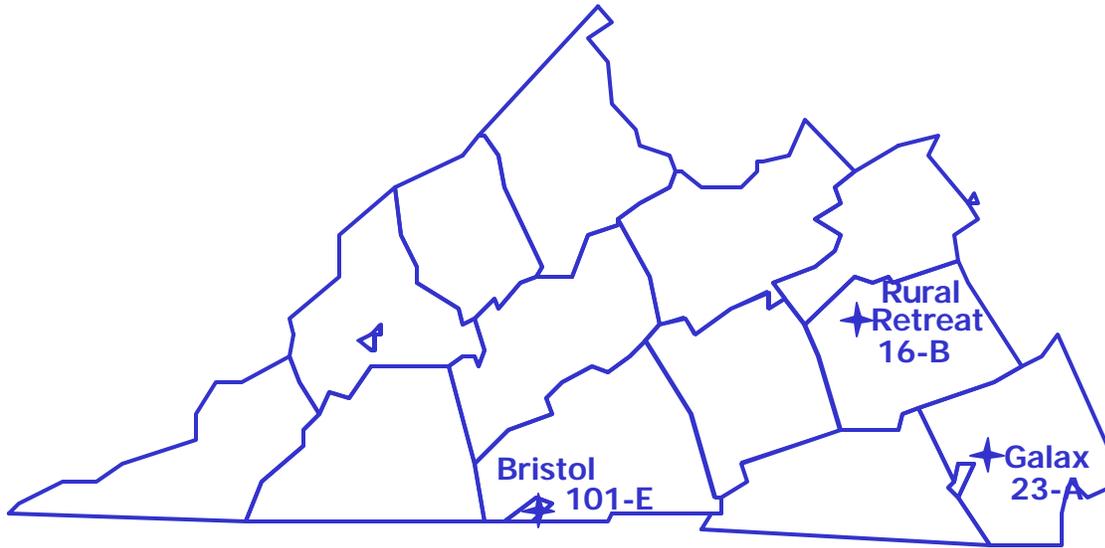
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**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2001**

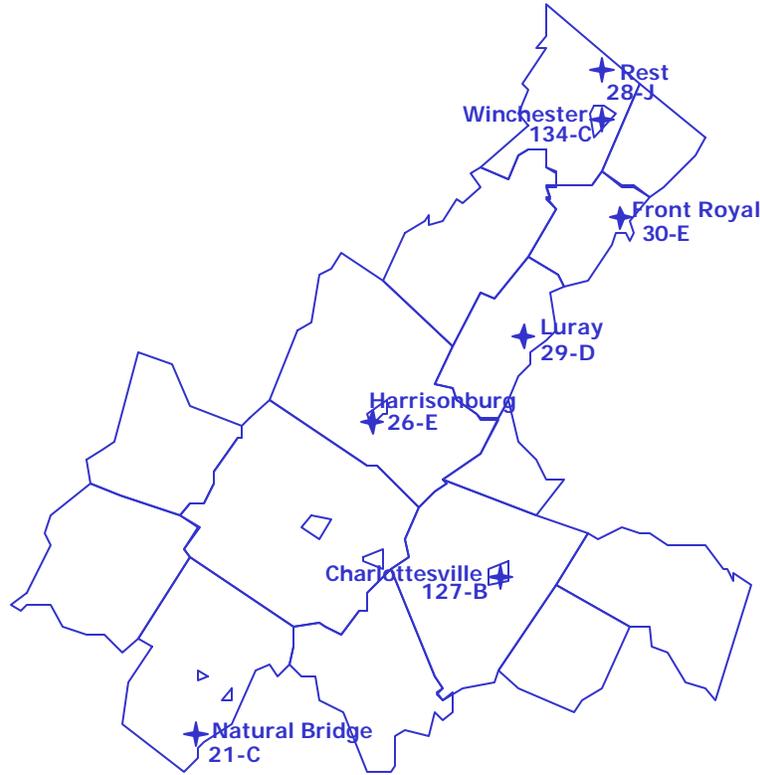
**SOUTHWEST MONITORING NETWORK**



STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/ COUNTY	LAT/ LONG
16-B	O <sub>3</sub>	SLAMS	Sewage Disposal Plant	51-197-0002	Rural Retreat Wythe Co.	36° 53' 35" 81° 15' 18"
23-A	PM <sub>10</sub>	SLAMS	Gladeville Elementary School	51-035-0001	Galax Carroll Co.	36° 42' 09" 80° 52' 48"
101-E	PM <sub>2.5</sub>	SLAMS	Highland View Elementary School	51-520-0006	Bristol	36° 36' 28" 82° 09' 52"

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2001**

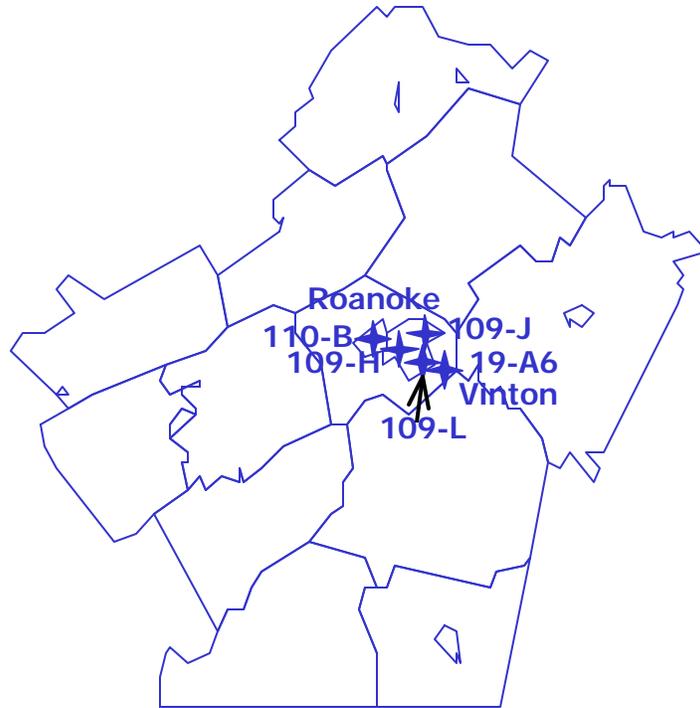
**VALLEY MONITORING NETWORK**



STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
21-C	O <sub>3</sub>	SLAMS IMPROVE	Natural Bridge Ranger Station	51-163-0003	Rockbridge Co.	37° 37' 34" 79° 30' 47"
26-E	PM <sub>10</sub> , SO <sub>2</sub>	SLAMS	Valley DEQ Office 4411 Early Road	51-165-0002	Harrisonburg Rockingham Co.	38° 23' 22" 78° 54' 51"
28-J	O <sub>3</sub>	SLAMS	Woodbine Road Lester Building Systems	51-069-0010	Rest Frederick Co.	39° 16' 58" 78° 04' 53"
29-D	O <sub>3</sub> , PM <sub>2.5</sub>	SLAMS	Luray Caverns Airport	51-139-0004	Luray Page Co.	38° 39' 48" 78° 30' 17"
30-E	PM <sub>10</sub>	SLAMS	Warren Co. Memorial Hospital 1000 Shenandoah Avenue	51-187-0004	Front Royal Warren Co.	38° 55' 58" 78° 11' 54"
127-B	PM <sub>10</sub>	SLAMS	City Hall Annex 606 E. Market Street	51-540-0002	Charlottesville	38° 01' 57" 78° 28' 37"
134-C	PM <sub>10</sub>	SLAMS	Winchester Courts Building	51-840-0002	Winchester	39° 11' 08" 78° 09' 47"

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2001**

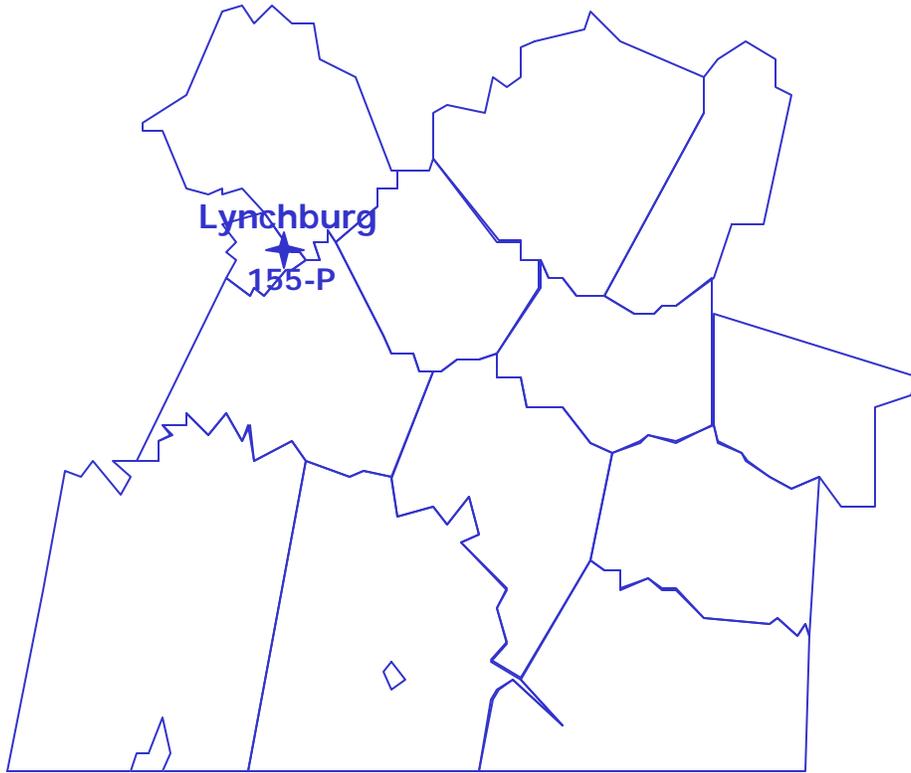
**WEST CENTRAL MONITORING NETWORK**



STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
19-A6	SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub>	NAMS/ SLAMS	East Vinton Elementary School Ruddell Road	51-161-1004	Vinton Roanoke Co.	37° 17' 08" 79° 53' 03"
109-H	PM <sub>10</sub>	SLAMS	101 Cherry Hill Circle	51-770-0011	Roanoke	37° 16' 33" 79° 59' 58"
109-J	CO	SLAMS	Carver Road & Courtland Drive	51-770-0013	Roanoke	37° 17' 05" 79° 56' 01"
109-L	PM <sub>2.5</sub>	SLAMS	Raleigh Court Library	51-770-0014	Roanoke	37° 15' 22" 79° 59' 06"
110-B	PM <sub>2.5</sub>	SLAMS	Market St. Fire Station	51-775-0010	Salem	37° 17' 31" 80° 03' 25"

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2001**

**SOUTH CENTRAL MONITORING NETWORK**



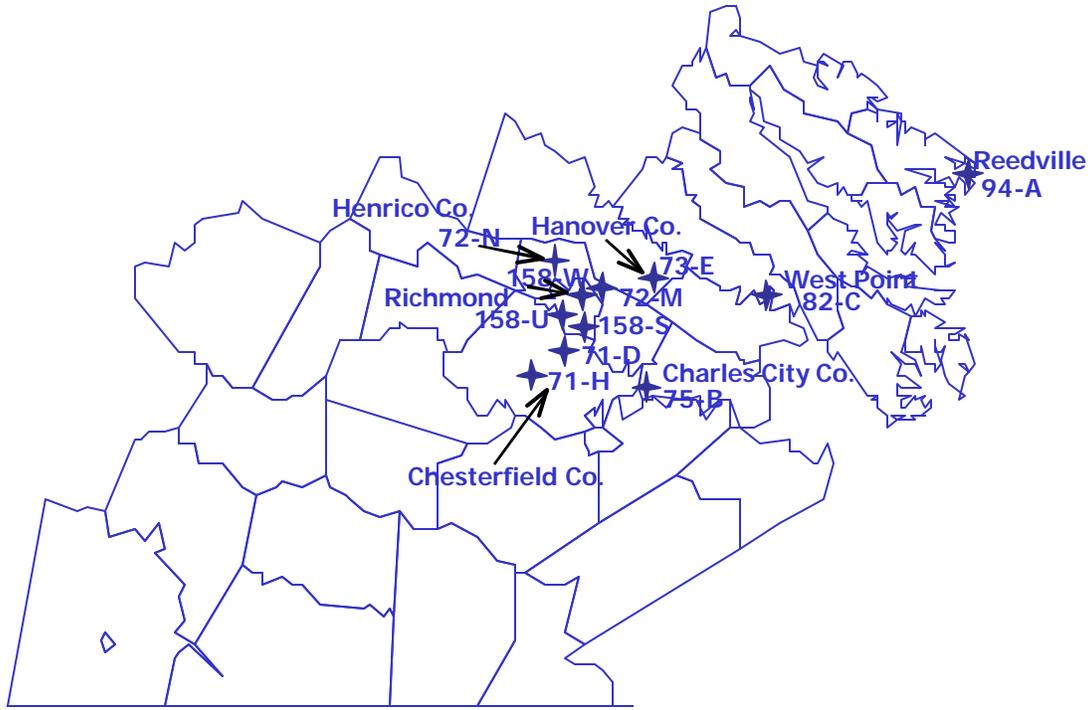

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STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/ COUNTY	LAT/ LONG
155-P *	PM <sub>2.5</sub>	SLAMS	Central Va. Community College	51-680-0014	Lynchburg	37° 21' 24" 79° 10' 31"

\* maintained by West Central Region personnel

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2001**

**PIEDMONT MONITORING NETWORK**



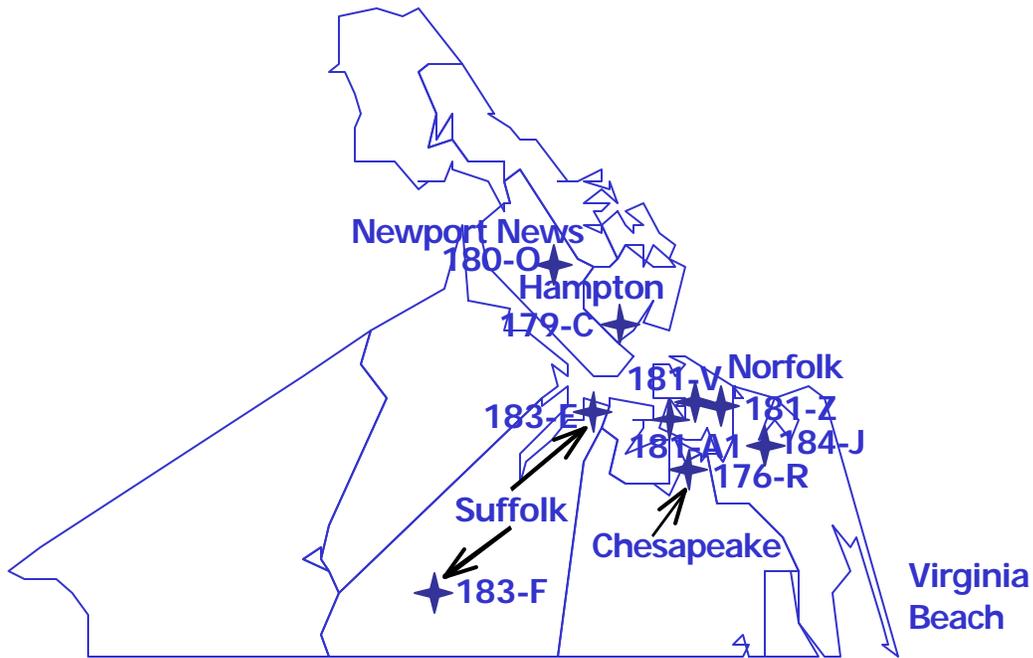
STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/ COUNTY	LAT/ LONG
71-D	PM <sub>2.5</sub>	SLAMS	Bensley Armory	51-041-0003	Chesterfield Co.	37° 26' 10" 77° 27' 03"
71-H	O <sub>3</sub>	SLAMS	Beach Road Highway Shop	51-041-0004	Chesterfield Co.	37° 21' 32" 77° 35' 37"
72-M	O <sub>3</sub> , VOC, PM <sub>2.5</sub>	NAMS/ SLAMS	Math and Science Center 2401 Hartman Street	51-087-0014	Henrico Co.	37° 33' 30" 77° 24' 01"
72-N	PM <sub>2.5</sub>	SLAMS	DEQ - Piedmont Regional Office 4949A Cox Road	51-087-0015	Henrico Co.	37° 40' 13" 77° 34' 03"
73-E	O <sub>3</sub>	SLAMS	McClellan Road	51-085-0003	Hanover Co.	37° 36' 21" 77° 13' 07"

**PIEDMONT (Cont.)**

<b>STATION NUMBER</b>	<b>POLLUT.</b>	<b>SITE TYPE</b>	<b>LOCATION</b>	<b>AIRS NUMBER</b>	<b>CITY/COUNTY</b>	<b>LAT/ LONG</b>
75-B	O <sub>3</sub> , NO <sub>2</sub> , SO <sub>2</sub> , PM <sub>2.5</sub>	NAMS/ SLAMS	Charles City County Route 608	51-036-0002	Charles City Co.	37° 20' 31" 77° 15' 39"
82-C	PM <sub>10</sub>	SLAMS	West Point Elementary School Thompson Ave. and Chelsea Road	51-101-0003	West Point King William Co.	37° 33' 34" 76° 47' 43"
94-A	PM <sub>10</sub>	SLAMS	Pumping Station Main Street	51-133-0001	Reedville Northumberland Co.	37° 50' 25" 76° 16' 44"
158-S	PM <sub>10</sub> , PM <sub>2.5</sub>	NAMS/ SLAMS	DEQ - Air Quality Assessment 5324 Distributor Drive	51-760-0020	Richmond	37° 30' 38" 77° 29' 54"
158-U	CO	SLAMS	Forest Hill Fire Station 7410 Forest Hill Avenue	51-760-0022	Richmond	37° 32' 22" 77° 31' 58"
158-W	CO, SO <sub>2</sub> , NO <sub>2</sub>	SLAMS	Science Museum of Virginia DMV and Leigh Street	51-760-0024	Richmond	37° 33' 45" 77° 27' 55"

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2001**

**TIDEWATER MONITORING NETWORK**



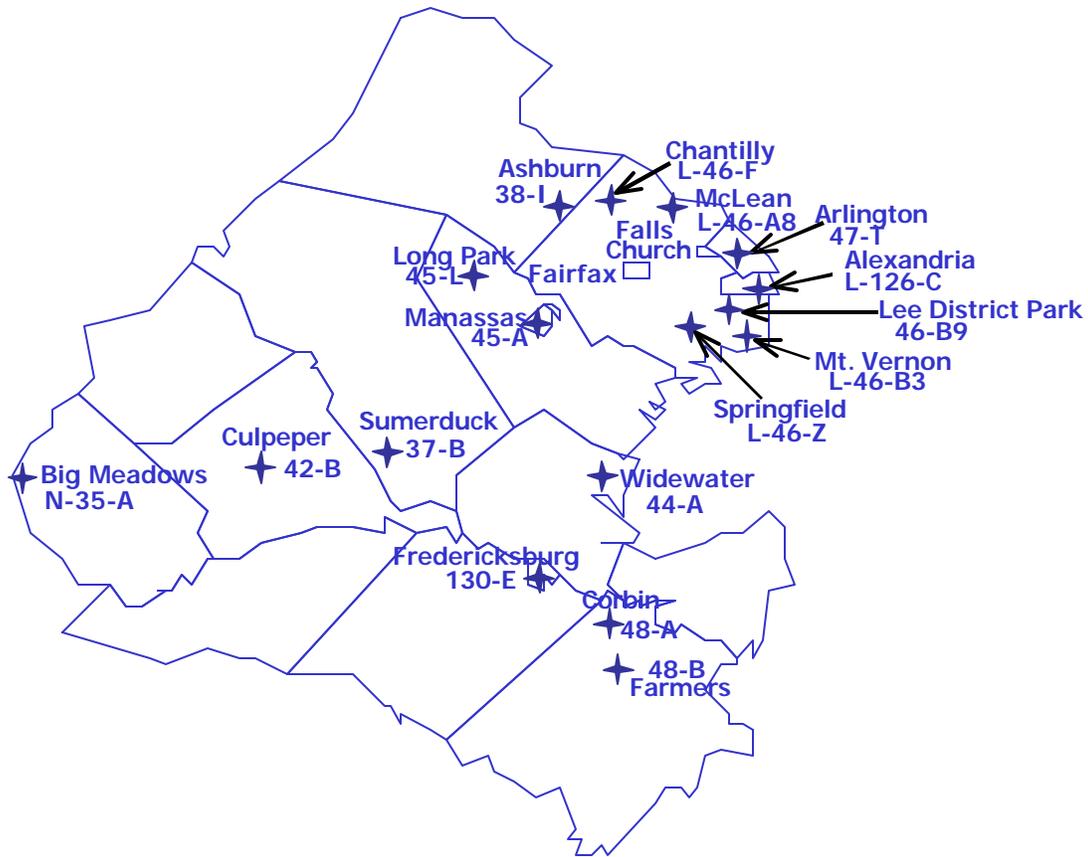
STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
176-R	PM <sub>10</sub> , PM <sub>2.5</sub>	NAMS/SLAMS	Oscar Smith Middle School Stadium 2500 Rodgers Street	51-550-0012	Chesapeake	36° 48' 14" 76° 16' 21"
179-C	PM <sub>10</sub> , CO, SO <sub>2</sub> , O <sub>3</sub> PM <sub>2.5</sub>	NAMS/SLAMS	Virginia School for the Deaf & Blind 700 Shell Road	51-650-0004	Hampton	37° 00' 12" 76° 23' 57"
180-O	PM <sub>2.5</sub>	SLAMS	Pump Station 103	51-700-0013	Newport News	37° 05' 59" 76° 28' 53"
181-A1	PM <sub>10</sub> , PM <sub>2.5</sub>	SLAMS	NOAA Property 2nd and Woodis Avenue	51-710-0024	Norfolk	36° 51' 28" 76° 18' 06"
181-V	CO	NAMS	Post Office 600 Church Street	51-710-0019	Norfolk	36° 51' 12" 76° 16' 43"

**TIDEWATER (Cont.)**

<b>STATION NUMBER</b>	<b>POLLUT.</b>	<b>SITE TYPE</b>	<b>LOCATION</b>	<b>AIRS NUMBER</b>	<b>CITY/ COUNTY</b>	<b>LAT/ LONG</b>
181-Z	CO, SO <sub>2</sub> , NO <sub>2</sub>	NAMS/ SLAMS	Norfolk State University	51-710-0023	Norfolk	36° 51' 01" 76° 15' 28"
183-E	O <sub>3</sub>	NAMS	Tidewater Community College Frederick Campus	51-800-0004	Suffolk	36° 54' 12" 76° 26' 19"
183-F	O <sub>3</sub>	NAMS	Tidewater Research Station Route 610	51-800-0005	Suffolk	36° 40' 03" 76° 43' 53"
184-J	PM <sub>2.5</sub>	SLAMS	DEQ - Tidewater Regional Office 5636 Southern Blvd.	51-810-0008	Va. Beach	36° 50' 28" 76° 10' 53"

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2001**

**NORTHERN VA. MONITORING NETWORK**



STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/ COUNTY	LAT/ LONG
37-B	O <sub>3</sub>	SLAMS	Phelps Wildlife Area Route 651	51-061-0002	Sumerduck Fauquier Co.	38° 28' 30" 77° 46' 04"
38-I	NO <sub>2</sub> , O <sub>3</sub> , PM <sub>2.5</sub>	SLAMS	Broad Run High School Route 641	51-107-1005	Ashburn Loudoun Co.	39° 01' 28" 77° 29' 24"
42-B	PM <sub>10</sub>	SLAMS	Farmington Elementary School Sunset Lane	51-047-0002	Culpeper Culpeper Co.	38° 27' 26" 78° 00' 40"
44-A	O <sub>3</sub>	SLAMS	Widewater Elementary School Den Rich Road	51-179-0001	Widewater Stafford Co.	38° 28' 59" 77° 22' 13"

**NORTHERN VA. (Cont.)**

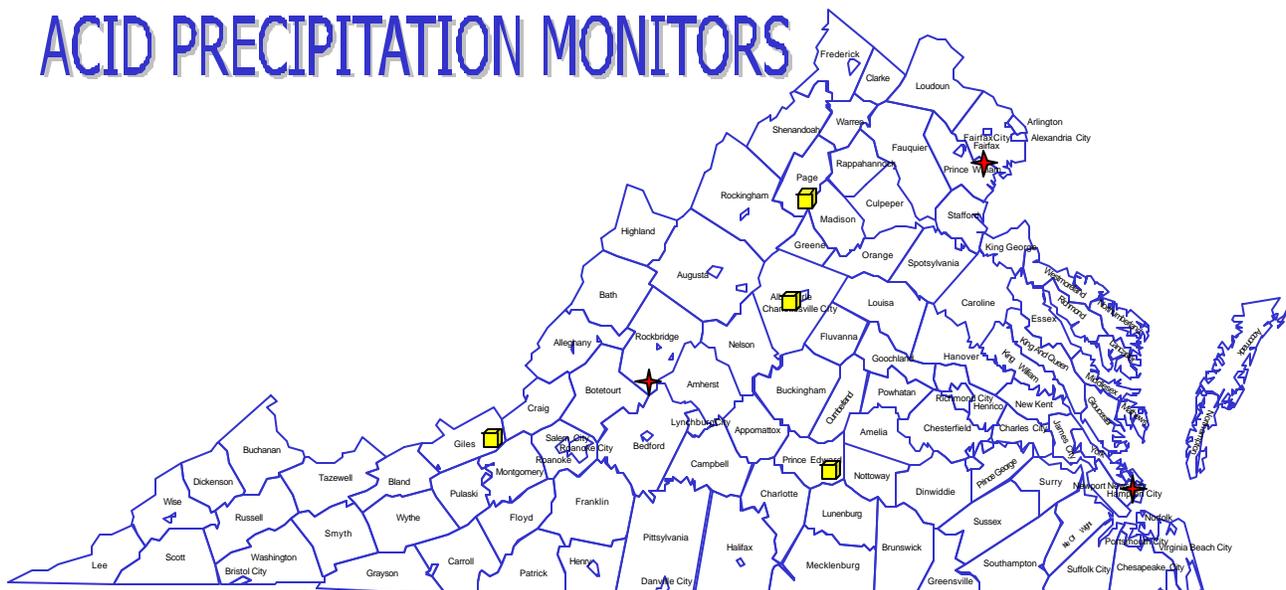
STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/ COUNTY	LAT/ LONG
45-A	PM <sub>10</sub>	SLAMS	Manassas Health Department 9301 Lee Avenue	51-153-0001	Manassas Prince William Co.	38° 45' 11" 77° 28' 39"
45-L	O <sub>3</sub> , NO <sub>2</sub>	SLAMS	Long Park Route 15	51-153-0009	Prince William Co.	38° 51' 19" 77° 38' 08"
46-B9	PAMS, NO <sub>y</sub> , O <sub>3</sub> , CO, PM <sub>2.5</sub>	PAMS	Lee District Park Telegraph Road	51-059-0030	Franconia Fairfax Co.	38° 46' 22" 77° 06' 20"
47-T	CO, NO <sub>2</sub> , O <sub>3</sub> , PM <sub>2.5</sub>	SLAMS	Aurora Hills Visitors Center 18th and Hayes Streets	51-013-0020	Arlington Co.	38° 51' 27" 77° 03' 33"
48-A	O <sub>3</sub> , NO <sub>y</sub> , NO <sub>2</sub> , VOC	PAMS	U.S.G.S. Geomagnetic Center	51-033-0001	Corbin Caroline Co.	38° 12' 11" 77° 22' 38"
48-B	MET.	PAMS	VDOT Residency Shop Route 2	51-033-0002	Farmers Caroline Co.	38° 04' 54" 77° 21' 49"
130-E	PM <sub>10</sub>	SLAMS	Hugh Mercer Elementary School 2100 Cowan Boulevard	51-630-0004	Fredericksburg	38° 18' 17" 77° 29' 11"
L-46-A8	CO, SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub> , PM <sub>2.5</sub>	SLAMS	McLean Governmental Center 1437 Balls Hill Road	51-059-5001	McLean Fairfax Co.	38° 55' 55" 77° 11' 56"
L-46-B3	PM <sub>10</sub> , O <sub>3</sub>	SLAMS	Mt. Vernon Fire Station 2675 Sherwood Hall Lane	51-059-0018	Mount Vernon Fairfax Co.	38° 44' 33" 77° 04' 39"
L-46-F	CO, SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub> , PM <sub>10</sub>	SLAMS	Upper Cub Run Drive	51-059-0005	Chantilly Fairfax Co.	38° 53' 38" 77° 27' 55"
L-46-Z	PM <sub>10</sub>	NAMS	Doctor's Exchange 6120 Brandon Avenue	51-059-3002	Springfield Fairfax Co.	38° 47' 01" 77° 10' 57"
L-126-C	CO, SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub>	NAMS/ SLAMS	Alexandria Health Department 517 North Saint Asaph Street	51-510-0009	Alexandria	38° 48' 38" 77° 02' 40"
N-35-A	O <sub>3</sub> , SO <sub>2</sub> PM <sub>2.5</sub>	Non-EPA Fed. IMPROVE	Big Meadows	51-113-0003	Madison Co.	38° 31' 19" 78° 26' 10"

**TABLE OF THE NUMBER OF CRITERIA POLLUTANT  
MONITORING SITES  
NAMS/SLAMS 2001**

<b>REGION</b>	<b>PM<sub>2.5</sub></b>	<b>PM<sub>10</sub></b>	<b>CO</b>	<b>SO<sub>2</sub></b>	<b>NO<sub>2</sub></b>	<b>O<sub>3</sub></b>	<b>TOTAL</b>
Southwest	1	1	---	---	---	1	3
Valley	1	4	---	1	---	3	9
West Central	3	1	1	1	1	1	8
Piedmont	5	3	2	2	2	4	18
Tidewater	5	3	3	2	1	3	17
*Northern	4	6	5	3	7	11	36
<b>TOTAL</b>	<b>19</b>	<b>18</b>	<b>11</b>	<b>9</b>	<b>11</b>	<b>23</b>	<b>91</b>

\* This includes sites operated by the DEQ, Fairfax Co., and Alexandria

# ACID PRECIPITATION MONITORS



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The Virginia Acid Precipitation Network (VAPN) consists of three monitoring sites in the following areas: Hampton, Rockbridge County, and Occoquan (Fairfax County). Weekly samples are collected and analyzed on site for pH and conductivity every Tuesday, and then mailed to the Department of General Services, Division of Consolidated Laboratory Services, Bureau of Chemistry, where the following chemical analyses are conducted: pH (laboratory), conductivity (laboratory), ammonium, chloride, sodium, potassium, magnesium, calcium, anion-cation balance, nitrate, sulfate, and phosphate. VAPN data and information are available upon request from the DEQ Air Division, Office of Data Analysis. VAPN site information and limited data are available on-line at <http://esm.versar.com/pprp/features/aciddep/regional.htm>.

"A Summary of Wet Deposition Data Collected in the Virginia Acid Precipitation Network, 1982-1997", prepared by the Maryland Power Plant Research Program in August 1998, is available on-line at <http://esm.versar.com/pprp/features/aciddep/Vapn.htm#report>.

In addition to the VAPN, the Federal National Acid Deposition Program (NADP) has four monitoring sites in Virginia: Big Meadows (Shenandoah National Park), Hortons Station (Giles County), Prince Edward County and Charlottesville. National Acid Deposition Program site information and data are available on-line at <http://nadp.sws.uiuc.edu>.



**AVERAGE CONCENTRATION OF DETECTABLE VOLATILE OZONE PRECURSORS  
PHOTOCHEMICAL ASSESSMENT MONITORING STATION (PAMS) TYPE I - CORBIN, VA**

Concentrations are in ppbC

Para. #	Compound Name	From June 1 to August 31, 2001										All Year
		0 a m - 3am	3am- 6am	6am- 9am	9am- 12pm	12pm- 3pm	3pm- 6pm	6pm- 9pm	9pm- 0am	Average 3-Hr sample	Average 24-Hr sample	Average 24-Hr sample
43203	ethylene	1.26	1.36	1.48	0.99	0.76	0.66	0.79	1.23	1.07	1.09	1.39
43206	acetylene	0.80	0.82	0.87	0.76	0.56	0.64	0.56	0.79	0.73	1.05	1.54
43202	ethane	4.18	4.12	4.20	3.99	3.52	3.12	3.01	3.41	3.69	3.86	4.87
43205	propylene	0.49	0.50	0.51	0.27	0.21	0.26	0.28	0.47	0.37	0.39	0.47
43204	propane	2.82	3.16	3.30	2.44	1.85	1.36	1.49	2.31	2.34	2.31	3.71
43214	isobutane	0.54	0.53	0.61	0.50	0.34	0.23	0.23	0.35	0.42	0.43	0.83
43280	1-butene	0.28	0.23	0.32	0.22	0.23	0.22	0.20	0.43	0.27	0.37	0.36
43212	n-butane	1.16	1.31	1.46	1.08	0.87	0.57	0.60	1.29	1.04	1.25	2.15
43216	t-2-butene	0.13	0.11	0.06	0.07	0.09	0.18	0.07	0.08	0.10	0.10	0.11
43217	c-2-butene	0.13	0.16	0.08	0.07	0.13	0.07	0.06	0.07	0.10	0.10	0.08
43221	isopentane	1.26	1.37	1.64	1.04	0.86	0.62	0.65	1.18	1.08	1.38	1.95
43224	1-pentene	0.47	1.01	0.71	0.54	0.45	0.50	0.74	0.70	0.64	0.51	0.40
43220	n-pentane	1.12	1.32	1.24	0.80	0.52	0.39	0.43	0.77	0.82	0.96	1.02
43243	isoprene	4.72	2.97	6.73	11.88	13.21	19.05	26.04	11.38	12.00	12.56	5.64
43226	t-2-pentene	0.07	0.13	0.11	0.05	0.06	0.06	0.06	0.08	0.08	0.10	0.11
43227	c-2-pentene	0.36	0.22	0.14	0.07	0.42	0.08	0.07	0.07	0.18	0.10	0.28
43244	2,2-dimethylbutane	0.16	0.18	0.16	0.13	0.23	0.09	0.10	0.16	0.15	0.11	0.20
43242	cyclopentane	0.09	0.09	0.09	0.08	0.14	0.05	0.09	0.08	0.09	0.07	0.06
43284	2,3-dimethylbutane	0.15	0.26	0.22	0.31	0.59	0.30	0.33	0.46	0.33	0.19	0.26
43285	2-methylpentane	0.92	1.00	1.25	1.31	1.47	1.48	1.25	1.40	1.26	1.86	1.14
43230	3-methylpentane	0.74	0.88	0.66	0.82	0.78	0.67	0.74	1.09	0.80	0.83	0.66
43245	1-hexene	0.34	0.29	0.39	0.41	0.28	0.24	0.29	0.42	0.33	0.33	0.25
43231	n-hexane	0.69	0.79	0.46	0.34	0.57	0.23	1.71	0.79	0.70	0.41	0.53
43262	methylcyclopentane	0.32	0.32	0.26	0.17	0.23	0.12	0.31	0.30	0.25	0.15	0.21
43247	2,4-dimethylpentane	0.27	0.50	0.24	0.25	0.22	0.26	0.25	0.26	0.28	0.16	0.27
45201	benzene	0.80	0.88	0.79	0.56	0.55	0.42	0.45	1.01	0.68	0.60	1.05
43248	cyclohexane	0.14	0.21	0.13	0.09	0.27	0.10	0.06	0.14	0.14	0.15	0.15
43263	2-methylhexane	0.35	0.43	0.40	0.25	0.39	0.24	0.21	0.34	0.32	0.42	0.40
43291	2,3-dimethylpentane	0.36	0.31	0.42	0.25	0.35	0.25	0.16	0.38	0.31	0.14	0.34
43249	3-methylhexane	1.31	1.44	1.03	1.12	2.80	1.08	0.96	1.21	1.37	1.50	1.13
43250	224-trimethylpentane	0.93	0.52	0.57	0.48	0.71	0.20	0.23	0.79	0.55	0.26	0.31
43232	n-heptane	0.24	0.50	0.31	0.21	0.65	0.39	0.12	0.26	0.33	0.22	0.26
43261	methylcyclohexane	2.63	2.45	2.63	2.40	1.99	2.51	2.40	2.17	2.40	0.13	0.16
43252	234-trimethylpentane	0.29	0.21	0.22	0.13	0.37	0.16	0.12	0.21	0.21	0.21	0.17
45202	toluene	1.66	2.05	2.10	1.22	0.96	0.66	0.66	1.18	1.31	1.27	1.52
43960	2-methylheptane	0.16	0.17	0.18	0.11	0.31	0.11	0.11	0.15	0.16	0.14	0.16

**AVERAGE CONCENTRATION OF DETECTABLE VOLATILE OZONE PRECURSORS  
PHOTOCHEMICAL ASSESSMENT MONITORING STATION (PAMS) TYPE I - CORBIN, VA (cont.)**

Concentrations are in ppbC

From June 1 to August 31, 2001												All Year
Para. #	C. NAME	0 a m - 3am	3am- 6am	6am- 9am	9am- 12pm	12pm- 3pm	3pm- 6pm	6pm- 9pm	9pm- 0am	Average 3-Hr sample	Average 24-Hr sample	Average 24-Hr sample
43253	3-methylheptane	1.07	0.63	0.59	0.83	1.23	1.01	0.90	0.93	0.90	1.40	0.87
43233	n-octane	0.34	0.46	0.27	0.30	0.64	0.33	0.16	0.26	0.35	0.31	0.28
45203	ethylbenzene	0.49	0.60	0.66	0.42	0.59	0.49	0.22	0.46	0.49	0.30	0.46
45109	m/p-xylene	1.27	1.44	1.63	0.81	0.79	0.71	0.55	0.86	1.01	0.60	0.74
45220	styrene	1.20	1.20	1.15	1.16	1.73	1.60	1.09	1.30	1.30	2.03	1.59
45204	o-xylene	2.01	1.88	1.86	1.73	1.88	1.62	1.59	1.57	1.77	0.82	0.49
43235	n-nonane	0.29	0.30	0.28	0.23	0.45	0.31	0.13	0.29	0.28	0.24	0.19
45210	isopropylbenzene	0.26	0.23	0.28	0.23	0.44	0.28	0.21	0.59	0.31	0.18	0.16
45209	n-propylbenzene	0.30	0.23	0.33	0.28	0.37	0.40	0.19	0.29	0.30	0.21	0.32
45212	m-ethyltoluene	0.16	0.25	0.28	0.12	0.25	0.08	0.10	0.19	0.18	0.14	0.31
45213	p-ethyltoluene	0.53	0.70	0.41	0.31	0.20	0.22	0.55	0.96	0.49	0.39	0.37
45207	135-trimethylbenzene	0.24	0.29	0.32	0.58	0.52	0.52	0.25	0.24	0.37	0.33	0.26
45211	o-ethyltoluene	0.67	0.38	0.22	0.26	0.47	0.33	0.39	0.34	0.38	0.68	0.36
45208	124-trimethylbenzene	0.50	0.61	0.58	0.46	0.75	0.69	1.50	1.60	0.84	1.12	0.83
43238	n-decane	0.34	0.46	0.44	0.39	0.38	0.33	0.17	0.38	0.36	0.33	0.26
45225	123-trimethylbenzene	0.35	0.47	0.28	0.32	0.47	0.61	0.36	0.36	0.40	0.88	0.62
45218	m-diethylbenzene	0.18	0.12	0.34	0.25	0.19	0.18	0.10	0.16	0.19	0.30	0.18
45219	p-diethylbenzene	0.21	0.18	0.21	0.14	0.28	0.18	0.12	0.24	0.19	0.46	0.31
43954	n-undecane	0.45	0.42	0.29	0.35	0.44	0.36	0.28	0.36	0.37	0.24	0.20
43141	n-dodecane	0.49	0.48	0.27	0.31	0.52	0.29	0.41	0.48	0.41	0.67	0.48
43000	PAMHC	42.83	43.35	45.82	44.18	49.79	47.10	54.28	48.71	47.01	47.24	43.19
43102	TNMOC	88.42	87.07	80.41	79.04	65.83	81.50	92.73	94.36	83.67	104.64	87.30



**DETECTABLE OZONE PRECURSORS IN 24-HOUR CANISTER SAMPLES**

**GC/FID - LEE DISTRICT PARK - FAIRFAX, VA**

**January 1 to December 31, 2001 - Concentrations are in ppbc**

Parameter #	COMPOUND NAME	N#	Minimum	Maximum	Median	Average	STDev
43203	ETHENE	60	0.76	12.77	2.32	3.03	2.35
43206	ETHYNE	60	0.50	10.69	1.89	2.59	1.94
43202	ETHANE	60	1.32	19.69	5.91	7.03	3.69
43205	PROPENE	60	0.40	4.97	1.02	1.25	0.88
43204	PROPANE	60	1.43	22.98	4.77	5.62	3.61
43214	ISOBUTANE	60	0.37	8.18	1.54	1.83	1.37
43280	1-BUTENE	60	0.13	3.51	0.87	1.22	0.91
43212	BUTANE	60	0.69	20.14	3.33	4.75	4.33
43216	t-2-BUTENE	60	0.00	0.84	0.15	0.19	0.16
43217	c-2-BUTENE	60	0.00	0.97	0.22	0.25	0.17
43221	ISOPENTANE	60	1.36	11.86	3.38	4.02	2.31
43224	1-PENTENE	60	0.19	1.04	0.38	0.42	0.17
43220	PENTANE	60	0.80	6.91	1.89	2.08	1.12
43243	ISOPRENE	60	0.00	20.72	0.57	2.89	4.66
43226	t-2-PENTENE	60	0.00	0.94	0.21	0.26	0.19
43227	c-2-PENTENE	60	0.00	0.57	0.16	0.18	0.12
43244	2,2-DIMETHYLBUTANE	60	0.00	0.90	0.28	0.31	0.15
43242	CYCLOPENTANE	60	0.00	0.66	0.17	0.20	0.12
43284	2,3-DIMETHYLBUTANE	60	0.15	1.56	0.62	0.63	0.27
43285	2-METHYLPENTANE	60	0.48	3.96	1.13	1.36	0.73
43230	3-METHYLPENTANE	60	0.36	2.72	0.84	0.97	0.50
43245	1-HEXENE	56	0.09	2.20	0.30	0.54	0.61
43231	HEXANE	60	0.32	3.37	0.90	1.06	0.63
43262	METHYLCYCLOPENTANE	60	0.18	1.83	0.54	0.63	0.33
43247	2,4DIMETHYLPENTANE	60	0.00	0.73	0.28	0.28	0.15
45201	BENZENE	60	0.65	5.36	1.76	1.99	0.92
43248	CYCLOHEXANE	60	0.00	1.04	0.28	0.31	0.17
43263	2-METHYLHEXANE	60	0.16	1.66	0.47	0.54	0.30
43291	2,3DIMETHYLPENTANE	60	0.00	1.07	0.48	0.50	0.19
43249	3-METHYLHEXANE	60	0.17	2.32	0.56	0.67	0.41
43250	2,2,4TMPENTANE	60	0.35	3.48	1.06	1.20	0.65
43232	HEPTANE	60	0.16	1.66	0.45	0.52	0.29
43261	METHYLCYCLOHEXANE	60	0.00	1.40	0.32	0.37	0.24
43252	2,3,4-TMPENTANE	60	0.20	1.34	0.59	0.63	0.25
45202	TOLUENE	60	0.26	11.24	3.49	4.03	2.18
43960	2-METHYLHEPTANE	60	0.11	0.93	0.28	0.31	0.15
43253	3-METHYLHEPTANE	60	0.00	0.73	0.20	0.23	0.15
43233	OCTANE	60	0.09	1.13	0.35	0.38	0.23
45203	ETHYLBENZENE	60	0.21	2.38	0.61	0.73	0.42
45109	m&p-XYLENE	60	0.64	6.95	1.72	2.09	1.28
45220	STYRENE	60	0.11	1.48	0.28	0.34	0.26

**DETECTABLE OZONE PRECURSORS IN 24-HOUR CANISTER SAMPLES**

**GC/FID - LEE DISTRICT PARK - FAIRFAX, VA (cont.)**

**January 1 to December 31, 2001 - Concentrations are in ppbc**

<b>Parameter #</b>	<b>COMPOUND NAME</b>	<b>N#</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Median</b>	<b>Average</b>	<b>STDev</b>
45204	o-XYLENE	60	0.22	2.64	0.68	0.81	0.50
43235	NONANE	60	0.10	0.92	0.32	0.34	0.16
45210	ISOPROPYLBENZENE	60	0.00	0.44	0.12	0.13	0.11
45209	PROPYLBENZENE	60	0.00	0.64	0.22	0.24	0.14
45212	1-ETHYL-3-MBENZENE	60	0.18	2.30	0.50	0.65	0.42
45213	1-ETHYL-4-MBENZENE	60	0.14	1.33	0.44	0.53	0.29
45207	135TMBENZENE	60	0.00	1.22	0.30	0.36	0.25
45211	1-ETHYL-2-MBENZENE	60	0.11	1.35	0.37	0.43	0.26
45208	124TMBENZENE	60	0.34	3.05	0.82	1.00	0.61
43238	DECANE	60	0.14	1.31	0.42	0.47	0.23
45225	1,2,3-TRIMBENZENE	60	0.00	12.37	0.71	1.13	1.68
45218	M-DIETHYLBENZENE	60	0.00	0.47	0.16	0.18	0.11
45219	P-DIETHYLBENZENE	60	0.00	0.87	0.17	0.19	0.13
43954	UNDECANE	60	0.15	1.05	0.41	0.44	0.19
43141	DODECANE	60	0.12	1.50	0.30	0.38	0.25
43000	TNMOC	60	27	198	60	66	34
43102	PAMSHC	60	60	262	101	111	45

3 hour Carbonyl Sampling - Lee District Park in Fairfax, VA - 2001

Summary Statistical Analysis - Unit of concentration: ppbV

Time	Parameter #	Compound Name	N#	Min	Max	Median	Average	STDev
9:00 am - 12:00 pm	43503	Acetaldehyde	27	0.59	2.08	1.11	1.18	0.36
	43551	Acetone	27	1.27	4.72	2.95	2.85	0.85
	43505	Acrolein	27	0.05	0.24	0.07	0.09	0.06
	43502	Formaldehyde	27	1.67	6.87	3.44	3.57	1.20
	43552	Methyl Ethyl Ketone	27	0.09	0.75	0.30	0.34	0.16
	43560	Methyl Isobutyl	27	0.01	0.08	0.03	0.03	0.01
	43504	Propionaldehyde	27	0.02	0.14	0.07	0.07	0.03
12:00 pm - 3:00 pm	43503	Acetaldehyde	27	0.65	1.77	1.30	1.23	0.33
	43551	Acetone	27	1.39	4.14	2.94	2.93	0.76
	43505	Acrolein	27	0.05	0.12	0.05	0.07	0.03
	43502	Formaldehyde	27	1.78	8.46	4.26	4.58	1.59
	43552	Methyl Ethyl Ketone	27	0.04	0.74	0.36	0.37	0.17
	43560	Methyl Isobutyl	27	0.01	0.04	0.03	0.03	0.01
	43504	Propionaldehyde	27	0.02	0.09	0.07	0.06	0.02
3:00 pm - 6:00 pm	43503	Acetaldehyde	28	0.71	2.26	1.20	1.24	0.33
	43551	Acetone	28	1.62	4.43	3.14	3.15	0.79
	43505	Acrolein	28	0.05	0.12	0.05	0.07	0.03
	43502	Formaldehyde	28	2.05	8.73	5.78	5.70	1.85
	43552	Methyl Ethyl Ketone	28	0.21	0.80	0.34	0.39	0.16
	43560	Methyl Isobutyl	28	0.01	0.04	0.03	0.03	0.01
	43504	Propionaldehyde	28	0.02	0.07	0.07	0.06	0.02
9:00 pm - 9:00 pm	43503	Acetaldehyde	28	0.78	2.11	1.16	1.15	0.28
	43551	Acetone	28	1.62	4.47	3.22	3.11	0.74
	43505	Acrolein	28	0.05	0.12	0.05	0.07	0.03
	43502	Formaldehyde	28	2.14	8.56	5.87	5.75	1.81
	43552	Methyl Ethyl Ketone	28	0.15	0.74	0.37	0.37	0.15
	43560	Methyl Isobutyl	28	0.01	0.04	0.03	0.03	0.01
	43504	Propionaldehyde	28	0.02	0.07	0.07	0.06	0.0

24 hour Carbonyl Sampling - Lee District Park in Fairfax, VA - 2001 (cont.)  
 Summary Statistical Analysis - Unit of concentration: ppbV

Parameter #	Compound Name	N#	Min	Max	Median	Average	STDev
43503	Acetaldehyde	58	0.39	2.70	0.75	0.84	0.38
43551	Acetone	58	0.49	3.09	1.29	1.32	0.53
43505	Acrolein	58	0.01	0.19	0.02	0.03	0.03
43502	Formaldehyde	58	0.49	7.10	2.17	2.69	1.59
43552	Methyl Ethyl Ketone	53	0.05	0.64	0.22	0.24	0.11
43560	Methyl Isobutyl Ketone	53	0.00	0.11	0.01	0.01	0.02
43504	Propionaldehyde	58	0.00	0.28	0.01	0.07	0.08

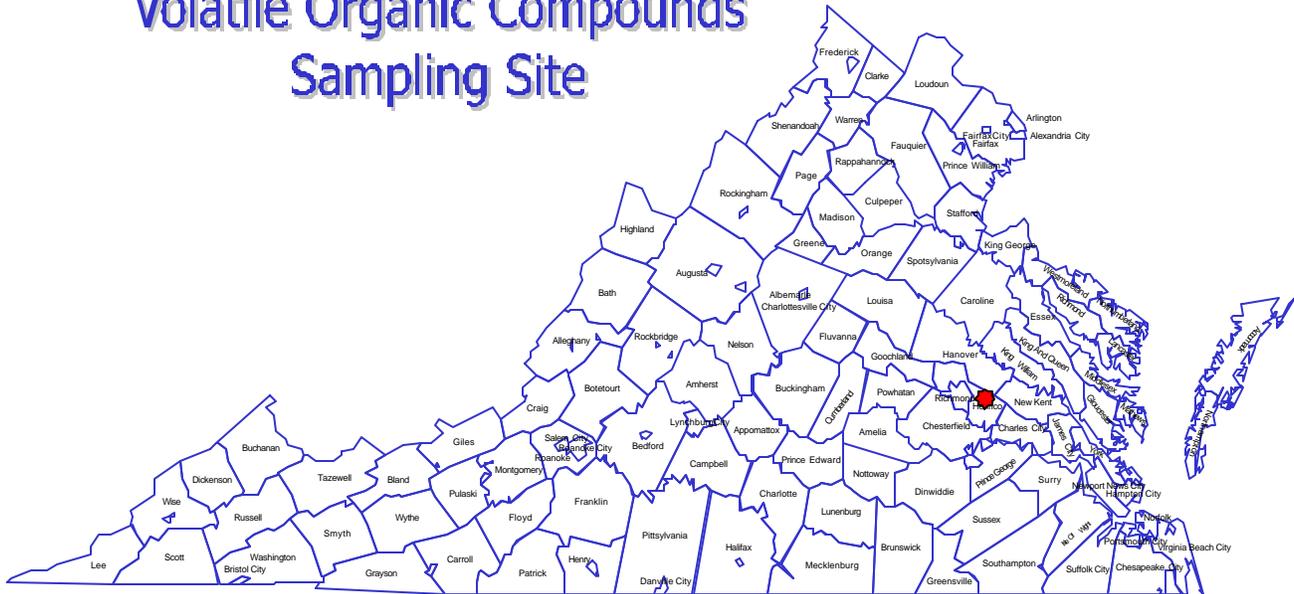
**DETECTABLE VOC IN 24-HOUR CANISTER SAMPLES**

**GC/MSD - LEE DISTRICT PARK - FAIRFAX, VA**

January 1 to December 31, 2001 - Concentrations are in ppbV

CAS NO.	Compound Name	N#	Minimum	Maximum	Median	Average	STDev
75-71-8	Dichlorodifluoromethane	60	0.33	0.90	0.56	0.56	0.12
74-87-3	Chloromethane	60	0.16	0.85	0.58	0.55	0.16
76-14-2	1,2-Dichloro-1,1,2,2,tetrafluoroethane	60	0.01	0.03	0.02	0.02	0.00
75-01-4	Chloroethene	60	0.00	0.01	0.00	0.00	0.00
106-99-0	1,3-Butadiene	60	0.01	0.19	0.05	0.06	0.05
74-83-9	Bromomethane	60	0.00	0.03	0.01	0.01	0.01
75-00-3	Chloroethane	60	0.00	0.04	0.01	0.01	0.01
75-69-4	Trichlorofluoromethane	60	0.10	0.56	0.27	0.28	0.07
75-35-4	1,1-Dichloroethene	60	0.00	0.02	0.00	0.00	0.00
75-09-2	Methylene Chloride	60	0.03	0.25	0.09	0.10	0.06
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	60	0.06	0.14	0.08	0.08	0.02
74-34-3	1,1-Dichloroethane	60	0.00	0.01	0.00	0.00	0.00
156-59-2	Cis-1,2-Dichloroethene	60	0.00	0.01	0.00	0.00	0.00
67-66-3	Chloroform	60	0.00	0.06	0.02	0.02	0.01
107-06-2	1,2-Dichloroethane	60	0.00	0.01	0.01	0.01	0.00
71-55-6	1,1,1-Trichloroethane	60	0.03	0.09	0.04	0.05	0.01
71-43-2	Benzene	60	0.08	0.80	0.23	0.28	0.14
56-23-5	Carbon tetrachloride	60	0.04	0.14	0.10	0.10	0.02
78-87-5	1,2-Dichloropropane	60	0.00	0.02	0.00	0.00	0.00
79-01-6	Trichloroethene	60	0.00	0.08	0.01	0.01	0.01
542-75-6	Cis-1,3-Dichloropropene	60	0.00	0.01	0.00	0.00	0.00
542-75-6	Trans-1,3-Dichloropropen	60	0.00	0.01	0.00	0.00	0.00
79-00-5	1,1,2-Trichloroethane	60	0.00	0.01	0.00	0.00	0.00
108-88-3	Toluene	60	0.12	1.41	0.31	0.42	0.29
106-93-4	1,2-Dibromoethane	60	0.00	0.01	0.00	0.00	0.00
127-18-4	Tetrachloroethylene	60	0.01	0.24	0.04	0.05	0.05
108-90-7	Chlorobenzene	60	0.00	0.00	0.00	0.00	0.00
100-41-4	Ethylbenzene	60	0.01	0.20	0.04	0.05	0.04
108-38-3	m & p- Xylene	60	0.02	0.85	0.09	0.14	0.14
100-42-5	Styrene	60	0.00	0.15	0.01	0.02	0.03
79-34-5	1,1,2,2-Tetrachloroethane	60	0.00	0.00	0.00	0.00	0.00
95-47-6	o-Xylene	60	0.02	0.20	0.04	0.05	0.04
622-96-8	1-Ethyl-4-Methylbenzene	60	0.00	0.05	0.01	0.01	0.01
108-67-8	1,3,5-Trimethylbenzene	60	0.00	0.05	0.01	0.02	0.01
95-63-6	1,2,4-Trimethylbenzene	60	0.00	0.30	0.04	0.05	0.05
100-44-7	Benzyl Chloride	60	0.00	0.01	0.00	0.00	0.00
541-73-1	1,3-dichlorobenzene	60	0.00	0.00	0.00	0.00	0.00
106-46-7	1,4-Dichlorobenzene	60	0.00	0.04	0.01	0.01	0.01
95-50-1	1,2-Dichlorobenzene	60	0.00	0.01	0.00	0.00	0.00
120-82-1	1,2,4-Trichlorobenzene	60	0.00	0.00	0.00	0.00	0.00
87-68-3	Hexachloro-1,3-Butadiene	60	0.00	0.00	0.00	0.00	0.00

# Volatile Organic Compounds Sampling Site



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In 2001, the Office of Air Quality Assessment (AQAs) of the Department of Environmental Quality operated a volatile organic compound sampling site located at the Math and Science Center in Henrico County.

Sampling frequency consisted of one 24-hour sample collected every 12th day. Data from this site were used to characterize VOCs concentrations in the Richmond (urban) area. The AQAs used the manual method for collecting ambient air samples. This method involves the collection of integrated, whole air samples by using evacuated Summa<sup>T</sup> canisters and Xontech air samplers. Each sample was analyzed by the Division of Consolidated Laboratory Services of the Department of General Services using a Gas Chromatograph/Flame Ionization Detector.

Detailed data collected at the Henrico Co. site in 2001 are available upon written request.

**DETECTABLE VOC IN 24-HOUR CANISTER SAMPLES  
GC/FID - MATH & SCIENCE CENTER - RICHMOND, VA**

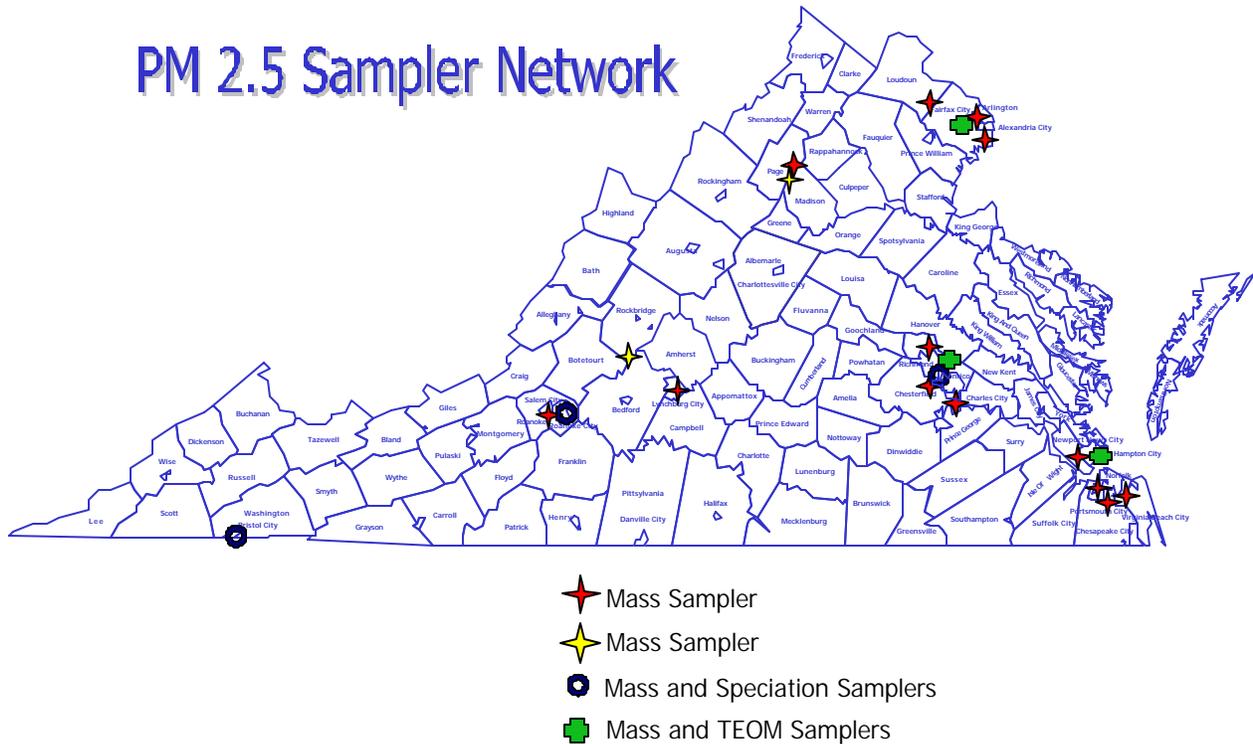
**January 1 to December 31, 2001 - Concentrations are in ppbV**

Parameter #	Compound Name	# N	Minimum	Maximum	Median	Average	STDev
43203	ethylene	27	0.89	5.39	2.17	2.31	1.19
43206	acetylene	27	0.62	4.43	1.77	1.87	1.05
43202	ethane	27	1.95	11.31	5.13	5.34	2.61
43205	propylene	27	0.24	1.30	0.49	0.55	0.26
43204	propane	27	1.06	6.56	2.34	2.52	1.24
43214	isobutane	27	0.16	1.98	0.62	0.64	0.37
43280	1-butene	27	0.05	1.15	0.22	0.30	0.24
43212	n-butane	27	0.32	5.99	1.36	1.75	1.27
43216	t-2-butene	27	0.01	0.19	0.04	0.05	0.05
43217	c-2-butene	27	0.01	0.42	0.05	0.09	0.11
43221	isopentane	27	0.06	3.35	1.25	1.43	0.68
43224	1-pentene	27	0.02	0.38	0.11	0.15	0.11
43220	n-pentane	27	0.24	1.79	0.66	0.67	0.32
43243	isoprene	27	0.03	1.76	0.17	0.44	0.53
43226	t-2-pentene	27	0.03	0.29	0.09	0.11	0.07
43227	c-2-pentene	27	0.01	0.18	0.04	0.06	0.05
43244	2,2-dimethylbutane	27	0.03	0.16	0.07	0.08	0.03
43242	cyclopentane	27	0.01	0.34	0.04	0.06	0.06
43284	2,3-dimethylbutane	27	0.03	1.16	0.20	0.28	0.26
43285	2-methylpentane	27	0.21	1.16	0.47	0.50	0.22
43230	3-methylpentane	27	0.12	0.70	0.23	0.27	0.15
43245	1-hexene	27	0.01	0.24	0.06	0.07	0.05
43231	n-hexane	27	0.09	0.93	0.24	0.27	0.17
43262	methylcyclopentane	27	0.02	0.42	0.11	0.15	0.09
43247	2,4-dimethylpentane	27	0.02	0.19	0.06	0.07	0.05
45201	benzene	27	0.13	0.96	0.43	0.46	0.20
43248	cyclohexane	27	0.01	0.22	0.05	0.06	0.05
43263	2-methylhexane	27	0.05	0.29	0.11	0.13	0.06
43291	2,3-dimethylpentane	27	0.02	0.28	0.07	0.09	0.06
43249	3-methylhexane	27	0.10	0.61	0.23	0.27	0.14
43250	224-trimethylpentane	27	0.10	0.65	0.22	0.26	0.15
43232	n-heptane	27	0.05	0.27	0.11	0.12	0.06
43261	methylcyclohexane	27	0.02	0.21	0.05	0.07	0.05
43252	234-trimethylpentane	27	0.03	0.23	0.09	0.10	0.05
45202	toluene	27	0.46	1.98	0.67	0.83	0.38
43960	2-methylheptane	27	0.01	0.17	0.04	0.05	0.04
43253	3-methylheptane	27	0.01	0.38	0.04	0.07	0.08
43233	n-octane	27	0.02	0.14	0.06	0.07	0.03
45203	ethylbenzene	27	0.05	0.32	0.10	0.12	0.07
45109	m/p-xylene	27	0.02	0.88	0.28	0.33	0.19
45220	styrene	27	0.05	0.29	0.17	0.16	0.06

**DETECTABLE VOC IN 24-HOUR CANISTER SAMPLES**  
**GC/FID - MATH & SCIENCE CENTER - RICHMOND, VA (cont.)**  
**January 1 to December 31, 2001 - Concentrations are in ppbV**

Parameter #	Compound Name	# N	Minimum	Maximum	Median	Average	STDev
45204	o-xylene	27	0.04	0.31	0.10	0.12	0.07
43235	n-nonane	27	0.02	0.14	0.05	0.05	0.03
45210	isopropylbenzene	27	0.01	0.10	0.01	0.02	0.02
45209	n-propylbenzene	27	0.01	0.26	0.05	0.06	0.05
45212	m-ethyltoluene	27	0.05	0.29	0.10	0.11	0.06
45213	p-ethyltoluene	27	0.02	0.14	0.05	0.06	0.03
45207	135-trimethylbenzene	27	0.01	0.19	0.05	0.06	0.04
45211	o-ethyltoluene	27	0.01	0.16	0.03	0.05	0.04
45208	124-trimethylbenzene	27	0.08	0.84	0.34	0.37	0.15
43238	n-decane	27	0.02	0.20	0.06	0.07	0.04
45225	123-trimethylbenzene	27	0.02	0.17	0.05	0.06	0.04
45218	m-diethylbenzene	27	0.01	0.11	0.02	0.03	0.02
45219	p-diethylbenzene	27	0.01	0.17	0.05	0.06	0.04
43954	n-undecane	27	0.00	0.10	0.04	0.05	0.03
43141	n-dodecane	27	0.01	0.18	0.05	0.06	0.05
43000	PAMHC	27	11.76	58.73	21.87	24.45	10.45

# PM 2.5 Sampler Network



**PM<sub>2.5</sub>** is particulate matter (PM) that is less than or equal to 2.5 microns in aerodynamic diameter. Particles originate from a variety of anthropogenic stationary and mobile sources as well as from natural sources. Particles may be emitted directly or formed in the atmosphere by transformation of gaseous emissions such as sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), and Volatile Organic Compounds (VOC). The chemical and physical properties of particulate matter vary greatly with time, region, meteorology, and source category, thus complicating the assessment of health and welfare effects.

PM<sub>2.5</sub> standards were implemented by EPA to “provide increased protection against a wide range of PM-related health effects”. These health effects include but are not limited to “premature mortality, decreased lung function, increased respiratory symptoms and disease such as asthma, and alterations in lung tissue”. The standards are “requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of the pollutant in the ambient air. These effects include but are not limited to effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well being”.

PM<sub>2.5</sub> samples are collected on a 47mm stretched Teflon filter media over a 24-hour period. Filters are retrieved from the field and shipped refrigerated via courier to the Virginia Division of Consolidated Laboratory Services. Once at the laboratory, the filters are equilibrated for a minimum of 24 hours and a final weight is recorded.

Monitoring stations meeting completeness criteria reported at least 75% of the total possible observations in a quarter, and collected enough data to produce four complete quarterly averages in a year.

In addition to the PM<sub>2.5</sub> network operated by the DEQ, the National Park Service and the USDA Forest Service operated PM<sub>2.5</sub> samplers at Big Meadows and in Rockbridge Co. as part of the IMPROVE (Interagency Monitoring of Protected Visual Environments) network. This network employs different sampling methods than those used by the DEQ. Data for the IMPROVE network can be found on the internet at <http://vista.cira.colostate.edu/improve>.

**VIRGINIA 2001**  
**PM2.5 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**

LOCATION/ STATION NO.	24-HOUR SAMPLING			QUARTERLY ARITHMETIC MEAN				ANNUAL		
	NO. OBS.	MAX	2ND MAX	I	II	III	IV	ARITH. MEAN	98 <sup>th</sup> PERCENTILE VALUE	
<b>SOUTHWEST REGION</b>										
BRISTOL Highland View Elementary School	101-E	111	43.4	36.2	13.0	16.0	19.3	12.2	15.2	34.2
<b>VALLEY REGION</b>										
LURAY Luray Caverns Airport	29-D	116	43.1	39.8	11.5	14.2	16.5	10.9	13.3	30.7
<b>WEST CENTRAL REGION</b>										
ROANOKE Raleigh Court Library	109-L	120	49.2	34.2	11.6	15.9	19.1	12.5	14.8	34.1
SALEM Market Street Fire Station	110-B	115	52.8	35.5	11.3	16.5	20.4	12.2	15.1	34.2
LYNCHBURG Central Va. Community College	155-P	115	50.2	37.2	9.7	17.7	18.8	11.5	14.4	36.2
<b>PIEDMONT REGION</b>										
CHESTERFIELD CO. Bensley Armory	71-D	106	50.8	35.7	12.6	14.4	16.4	11.6	13.8	33.2
HENRICO CO. Math & Science Center	72-M	116	45.1	35.5	11.5	14.7	16.3	11.4	13.5	34.4

**VIRGINIA 2001**  
**PM2.5 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**

LOCATION/ STATION NO.	24-HOUR SAMPLING			QUARTERLY ARITHMETIC MEAN				ANNUAL		
	NO. OBS.	MAX	2ND MAX	I	II	III	IV	ARITH. MEAN	98 <sup>TH</sup> PERCENTILE VALUE	
<b>PIEDMONT REGION (cont.)</b>										
HENRICO CO. Piedmont Regional Office	72-N	115	45.0	34.1	10.6	15.6	16.2	9.4	13.0	32.7
CHARLES CITY CO. Route #608	75-B	104	51.5	33.6	10.8	15.7	17.5	10.2	13.6	33.2
RICHMOND Air Monitoring Office	158-S	355	49.1	41.9	13.7	15.7	16.6	12.8	14.7	33.3
<b>TIDEWATER REGION</b>										
CHESAPEAKE Oscar Smith Stadium	176-R	313	43.4	41.9	13.7	14.7	13.5	12.0	13.5	29.7
HAMPTON Va. School for the Deaf & Blind	179-C	104	47.9	39.4	12.5	16.6*	14.7	10.4	13.6*	34.2
NEWPORT NEWS Pump Station #103	180-O	109	50.0	32.9	11.2	12.6	15.0	9.3	12.0	26.8
NORFOLK NOAA Facility	181-A1	110	41.9	38.0	13.1	15.1	15.8	10.3	13.6	31.1
VA. BEACH Tidewater Regional Office	184-J	116	39.9	38.2	13.7	13.8	13.5	10.0	12.7	29.3

\* Did not meet EPA's minimum requirements for data capture.

**VIRGINIA 2001**  
**PM2.5 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**

REGION/LOCATION STATION NO.	24-HOUR SAMPLING			QUARTERLY ARITHMETIC MEAN				ANNUAL		
	NO. OBS.	MAX	2ND MAX	I	II	III	IV	ARITH. MEAN	98 <sup>TH</sup> PERCENTILE VALUE	
<b>NORTHERN REGION</b>										
LOUDOUN CO. Broad Run High School	38-I	112	48.2	37.5	11.9	14.8	16.7	13.0	14.1	35.6
FAIRFAX CO. Lee District Park	46-B9	290	40.1	39.0	12.9	15.7	16.1*	12.7	14.3*	34.3
ARLINGTON CO. Aurora Hills Visitors Center	47-T	126	46.5	37.2	14.5	15.9	15.3	13.2	14.7	37.2
FAIRFAX CO. McLean Governmental Center	L-46-A8	106	48.4	39.4	14.1	14.9	16.4	12.5	14.5	37.8

\* Did not meet EPA's minimum requirements for data capture.

**VIRGINIA 2001**  
**PM2.5 PARTICULATE MATTER CONCENTRATIONS IN RANGES**  
**METHOD 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Three Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0 to 15	16 to 30	31 to 50	51 to 70	71 to 90	91 to 110	>110	
<b>SOUTHWEST REGION</b>									
BRISTOL Highland View Elementary School	101-E 111	63	41	7	0	0	0	0	0
<b>VALLEY REGION</b>									
LURAY Luray Caverns Airport	29-D 116	78	35	3	0	0	0	0	0
<b>WEST CENTRAL REGION</b>									
ROANOKE Raleigh Court Library	109-L 120	76	35	9	0	0	0	0	0
SALEM Market Street Fire Station	110-B 115	73	34	7	1	0	0	0	0
LYNCHBURG Central Va. Community College	155-P 115	74	34	7	0	0	0	0	0

**VIRGINIA 2001**  
**PM2.5 PARTICULATE MATTER CONCENTRATIONS IN RANGES**  
**METHOD 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Three Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0 to 15	16 to 30	31 to 50	51 to 70	71 to 90	91 to 110	>110	
<b>PIEDMONT REGION</b>									
CHESTERFIELD CO. 71-D Bensley Armory	106	68	34	3	1	0	0	0	0
HENRICO CO. 72-M Math & Science Center	116	80	30	6	0	0	0	0	0
HENRICO CO. 72-N Piedmont Regional Office	115	81	30	4	0	0	0	0	0
CHARLES CITY CO. 75-B Route #608	104	71	26	6	1	0	0	0	0
RICHMOND 158-S* Air Monitoring Office	355	218	122	15	0	0	0	0	0
<b>TIDEWATER REGION</b>									
CHESAPEAKE 176-R* Oscar Smith Middle School	313	214	94	5	0	0	0	0	0
HAMPTON 179-C Va. School for the Deaf & Blind	104	68	33	3	0	0	0	0	0

\* These samplers run daily.

**VIRGINIA 2001**  
**PM2.5 PARTICULATE MATTER CONCENTRATIONS IN RANGES**  
**METHOD 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Three Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0	16	31	51	71	91	>110	
		to 15	to 30	to 50	to 70	to 90	to 110		
<b>TIDEWATER REGION (continued)</b>									
NEWPORT NEWS Pump Station #103	180-O	109	81	26	2	0	0	0	0
NORFOLK NOAA Facility	181-A1	110	76	31	3	0	0	0	0
VIRGINIA BEACH Tidewater Regional Office	184-J	116	82	32	2	0	0	0	0
<b>NORTHERN REGION</b>									
LOUDOUN Broad Run High School	38-I	112	77	27	8	0	0	0	0
FAIRFAX CO. Lee District Park	46-B9*	290	191	87	12	0	0	0	0
ARLINGTON CO. Aurora Hills Visitors Center	47-T	126	78	40	8	0	0	0	0
<b>FAIRFAX COUNTY</b>									
FAIRFAX CO. McLean Governmental Center	L-46-A8	106	71	28	7	0	0	0	0

\* This sampler runs daily.

# 2001 MONITORING SCHEDULE

## 3-Day Monitoring Schedule for PM2.5 MASS Samplers

January						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February						
Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

March						
Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

April						
Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

May						
Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

June						
Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

July						
Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

August						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

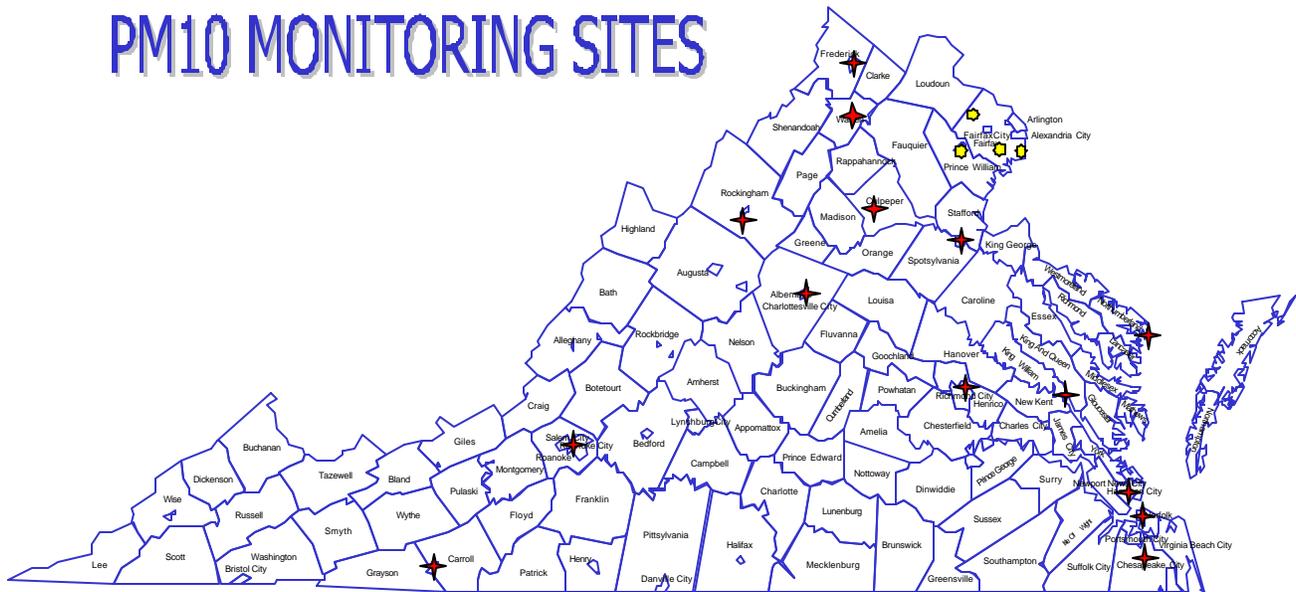
September						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

October						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

November						
Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

December						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

# PM<sub>10</sub> MONITORING SITES



## Reporting Organizations

- ★ VA Department of Environmental Quality
- ★ Fairfax County Health Department

**PM<sub>10</sub>** is particulate matter with an aerodynamic diameter less than or equal to a nominal 10 microns. It is that portion of total suspended particulate that has the capability to penetrate the thoracic region of the human respiratory system. In addition to health effects, particles in this size range can impair visibility, have an effect on climate, and contribute to acidic dry deposition.

PM<sub>10</sub> samples are obtained by drawing ambient air through a specially designed particle size discrimination inlet at 40 cubic feet per minute for 24 hours. The particles in the PM<sub>10</sub> size range are collected on preweighed 8 x 10 inch microquartz filters which are subsequently reweighed to determine the particulate mass. The weighings are performed by the Virginia DEQ, Office of Air Quality Assessment, except for Fairfax County, which perform their own analyses. The results are reported as micrograms per cubic meter (ug/m<sup>3</sup>). The normal sampling schedule is every sixth day from midnight to midnight.

Stations meeting completeness criteria reported at least 75% of the total possible observations in a quarter, and collected enough data to produce four complete quarterly averages in a year.

**VIRGINIA 2001**  
**PM10 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	24-HOUR SAMPLING			QUARTERLY ARITHMETIC MEAN				ANNUAL			
	NO. OBS.	MAX	2ND MAX	I	II	III	IV	ARITH MEAN	CONC. >150	99 <sup>th</sup> PERCENTILE	
<b>SOUTHWEST REGION</b>											
CARROLL CO. Galax, Gladeville Elem. School	23-A	61	44	42	15	20	21	19	19	0	44
<b>VALLEY REGION</b>											
HARRISONBURG Valley DEQ Office	26-E	60	60	54	20	25	23	23	23	0	60
WARREN CO. Front Royal, Memorial Hospital	30-E	59	41	38	14	19	21	18	18	0	41
CHARLOTTESVILLE 606 E. Market Street	127-B	57	42	37	16	19	20	17	18	0	42
WINCHESTER Winchester Courts Building	134-C	57	51	41	17*	20	20	17	19*	0	51
<b>WEST CENTRAL REGION</b>											
ROANOKE 101 Cherry Hill Circle	109-H	60	61	52	23	32	29	23	27	0	61

\* Did not meet EPA's minimum requirements for data capture.

**VIRGINIA 2001**  
**PM10 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	24-HOUR SAMPLING			QUARTERLY ARITHMETIC MEAN				ANNUAL			
	NO. OBS.	MAX	2ND MAX	I	II	III	IV	ARITH MEAN	CONC. >150	99 <sup>TH</sup> PERCENTILE VALUE	
<b>PIEDMONT REGION</b>											
KING WILLIAM CO. 82-C West Point Elementary School	58	45	36	13	19	19	14	16	0	45	
NORTHUMBERLAND CO. 94-A Reedville Pumping Station	56	48	37	12	19	19	14	16	0	48	
RICHMOND 158-S 5324 Distributor Drive	58	47	42	15	24	24	20	20	0	47	
<b>TIDEWATER REGION</b>											
CHESAPEAKE 176-R Oscar Smith Middle School	55	45	38	18	21	22	17	19	0	45	
HAMPTON 179-C Va. School for the Deaf & Blind	57	46	39	16	20	21	17	19	0	46	
NORFOLK 181-A1 NOAA Property	56	38	34	16	21	22	18	19	0	38	

**VIRGINIA 2001**  
**PM10 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	24-HOUR SAMPLING			QUARTERLY ARITHMETIC MEAN				ANNUAL			
	NO. OBS.	MAX	2ND MAX	I	II	III	IV	ARITH MEAN	CONC. >150	99 <sup>TH</sup> PERCENTILE VALUE	
<b>NORTHERN REGION</b>											
FREDERICKSBURG Mercer Elementary School	130-E	61	38	38	13	17	19	15	16	0	38
CULPEPER CO. Farmington Elementary School	42-B	60	42	38	14	18	19	14	16	0	42
PRINCE WILLIAM CO. Manassas Health Department	45-A	53	39	38	14	20	19*	18	18*	0	39
<b>FAIRFAX COUNTY</b>											
FAIRFAX CO. Mt. Vernon, 2675 Sherwood Hall Ln.	L-46-B3	51	46	42	18	21	22	22	21	0	46
FAIRFAX CO. Chantilly, Upper Cub Run Treat. Plt.	L-46-F	57	49	45	13	18	24	18	18	0	49
FAIRFAX CO. Springfield, 6120 Brandon Avenue	L-46-Z	56	42	42	16	20	21	19	19	0	42

\* Did not meet EPA's minimum requirements for data capture.

**VIRGINIA 2001**  
**PM10 PARTICULATE MATTER CONCENTRATIONS IN RANGES**  
**METHOD 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0	26	51	76	101	126	>150	
		to 25	to 50	to 75	to 100	to 125	to 150		
<b>SOUTHWEST REGION</b>									
CARROLL CO. Galax, Gladeville Elem. School	23-A 61	47	14	0	0	0	0	0	0
<b>VALLEY REGION</b>									
HARRISONBURG Valley DEQ Office	26-E 60	44	14	2	0	0	0	0	0
WARREN CO. Front Royal, Memorial Hospital	30-E 59	48	11	0	0	0	0	0	0
CHARLOTTESVILLE 606 E. Market Street	127-B 57	48	9	0	0	0	0	0	0
WINCHESTER. Winchester Courts Building	134-C 57	45	11	1	0	0	0	0	0

**VIRGINIA 2001**  
**PM10 PARTICULATE MATTER CONCENTRATIONS IN RANGES**  
**METHOD 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0 to 25	26 to 50	51 to 75	76 to 100	101 to 125	126 to 150	>150	
<b>WEST CENTRAL REGION</b>									
ROANOKE 101 Cherry Hill Circle	109-H 60	28	30	2	0	0	0	0	0
<b>PIEDMONT REGION</b>									
KING WILLIAM CO. West Point Elementary School	82-C 58	51	7	0	0	0	0	0	0
NORTHUMBERLAND CO. Reedville, Pumping Station	94-A 56	48	8	0	0	0	0	0	0
RICHMOND 5324 Distributor Drive	158-S 58	41	17	0	0	0	0	0	0
<b>TIDEWATER REGION</b>									
CHESAPEAKE Oscar Smith Middle School	176-R 55	42	13	0	0	0	0	0	0
HAMPTON Va. School for the Deaf & Blind	179-C 57	45	12	0	0	0	0	0	0
NORFOLK NOAA Property	181-A1 56	44	12	0	0	0	0	0	0

**VIRGINIA 2001**  
**PM10 PARTICULATE MATTER CONCENTRATIONS IN RANGES**  
**METHOD 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0	26	51	76	101	126	>150	
		to 25	to 50	to 75	to 100	to 125	to 150		
<b>NORTHERN REGION</b>									
FREDERICKSBURG Mercer Elementary School	130-E 61	51	10	0	0	0	0	0	0
CULPEPER CO. Farmington Elementary School	42-B 60	52	8	0	0	0	0	0	0
PRINCE WILLIAM CO. Manassas Health Department	45-A 53	42	11	0	0	0	0	0	0
<b>FAIRFAX COUNTY</b>									
FAIRFAX CO. Mt. Vernon, 2675 Sherwood Hall Ln.	L-46-B3 51	34	17	0	0	0	0	0	0
FAIRFAX CO. Chantilly, Upper Cub Run Treat. Plt.	L-46-F 57	44	13	0	0	0	0	0	0
FAIRFAX CO. Springfield, 6120 Brandon Avenue	L-46-Z 56	41	15	0	0	0	0	0	0

# 2001 MONITORING SCHEDULE

## 6-Day Monitoring Schedule for PM10

January						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February						
Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

March						
Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

April						
Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

May						
Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

June						
Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

July						
Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

August						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

September						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

October						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

November						
Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

December						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

# CO MONITORING SITES



## Reporting Organizations

-  VA Department of Environmental Quality
-  Fairfax County Health Department

**CARBON MONOXIDE** (CO) is produced by incomplete combustion of carbon compounds, principally in internal combustion engines. Concentrations in the vicinity of heavily traveled highways are higher than ambient concentrations more than 100 meters from any highway. Carbon monoxide is not an irritant, and has little or no effect on plants or materials; however, it reacts in the bloodstream to deprive the heart and brain of oxygen. Moderate concentrations significantly reduce brain function and high concentrations can be lethal.

Carbon monoxide is measured continuously by infrared absorption photometry. Air is drawn continuously through a sample cell where infrared light passes through it. CO molecules in the air absorb part of the infrared light, reducing the intensity of the light reaching a light sensor. This portion of the infrared light absorbed by CO is converted into an electrical signal reflecting the CO concentration, and recorded.

**VIRGINIA 2001  
CARBON MONOXIDE SUMMARY BY REGIONS  
METHOD 51 AND 67 - NONDISPERSIVE INFRARED  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR OBS.	ONE HOUR AVERAGES						EIGHT HOUR AVERAGES*				
		MAX	DATE TIME	2ND MAX	DATE TIME	>35	MAX	DATE TIME	2ND MAX	DATE TIME	>9	
<b>WEST CENTRAL REGION</b>												
ROANOKE Carver Road	109-J	8529	4.9	JAN 24 7:00 AM	4.5	JAN 15 8:00 AM	0	3.6	NOV 16 MIDNIGHT	3.4	JAN 8 1:00 AM	0
<b>PIEDMONT REGION</b>												
RICHMOND Forest Hill Fire Station	158-U	8692	3.2	JAN 5 7:00 PM	3.1	JAN 11 7:00 AM	0	2.3	JAN 5 2:00 AM	2.3	DEC 4 MIDNIGHT	0
RICHMOND Science Museum of VA	158-W	8673	5.7	JAN 11 7:00 PM	4.9	NOV 16 8:00 PM	0	3.6	NOV 16 1:00 AM	3.1	JAN 12 MIDNIGHT	0
<b>TIDEWATER REGION</b>												
HAMPTON Va. School for the Deaf & Blind	179-C	8473	5.5	NOV 16 10:00 PM	4.4	NOV 16 9:00 PM	0	2.4	DEC 4 3:00 AM	2.3	NOV 16 7:00 AM	0
NORFOLK Post Office Garage	181-V	8589	8.6	NOV 16 7:00 PM	7.2	NOV 7 7:00 PM	0	5.6	NOV 16 11:00 PM	4.2	NOV 15 4:00 AM	0
NORFOLK Norfolk State University	181-Z	8572	5.3	NOV 16 11:00 PM	5.0	NOV 7 9:00 PM	0	3.8	NOV 17 MIDNIGHT	3.5	NOV 8 MIDNIGHT	0
<b>NORTHERN REGION</b>												
ARLINGTON CO. Aurora Hills Visitors Center	47-T	8460	4.7	JAN 24 8:00 AM	4.1	JAN 24 7:00 AM	0	2.7	JAN 11 4:00 AM	2.7	JAN 24 10:00 AM	0

\*Eight Hour Averages stated as Ending Hour

**VIRGINIA 2001  
CARBON MONOXIDE SUMMARY BY REGION  
METHOD 51 AND 54 - NONDISPERSIVE INFRA-RED  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR OBS.	ONE HOUR AVERAGES					EIGHT HOUR AVERAGES*					
		MAX	DATE TIME	2ND MAX	DATE TIME	>35	MAX	DATE TIME	2ND MAX	DATE TIME	>9	
<b>NORTHERN REGION</b>												
FRANCONIA Lee District Park	46-B9 8599	3.1	JAN 24 8:00 AM	2.6	JAN 7 11:00 PM	0	1.9	JAN 8 1:00 PM	1.9	JAN 24 11:00 AM	0	
<b>ALEXANDRIA</b>												
ALEXANDRIA 517 N. St. Asaph Street	L-126-C 8614	5.1	JAN 10 8:00 PM	4.3	JAN 10 7:00 PM	0	2.6	JAN 11 MIDNIGHT	2.4	JAN 8 MIDNIGHT	0	
<b>FAIRFAX COUNTY</b>												
FAIRFAX CO. McLean Governmental Center	L-46-A8 8669	5.3	JAN 10 6:00 PM	4.6	JAN 24 8:00 AM	0	3.1	JAN 24 MIDNIGHT	3.0	JAN 8 1:00 AM	0	
FAIRFAX CO. Upper Cub Run Treatment Plt.	L-46-F 8338	1.7	JAN 12 9:00 AM	1.7	FEB 9 8:00 AM	0	1.3	JAN 14 8:00 AM	1.3	JAN 24 4:00 AM	0	

\*Eight Hour Averages stated as Ending Hour

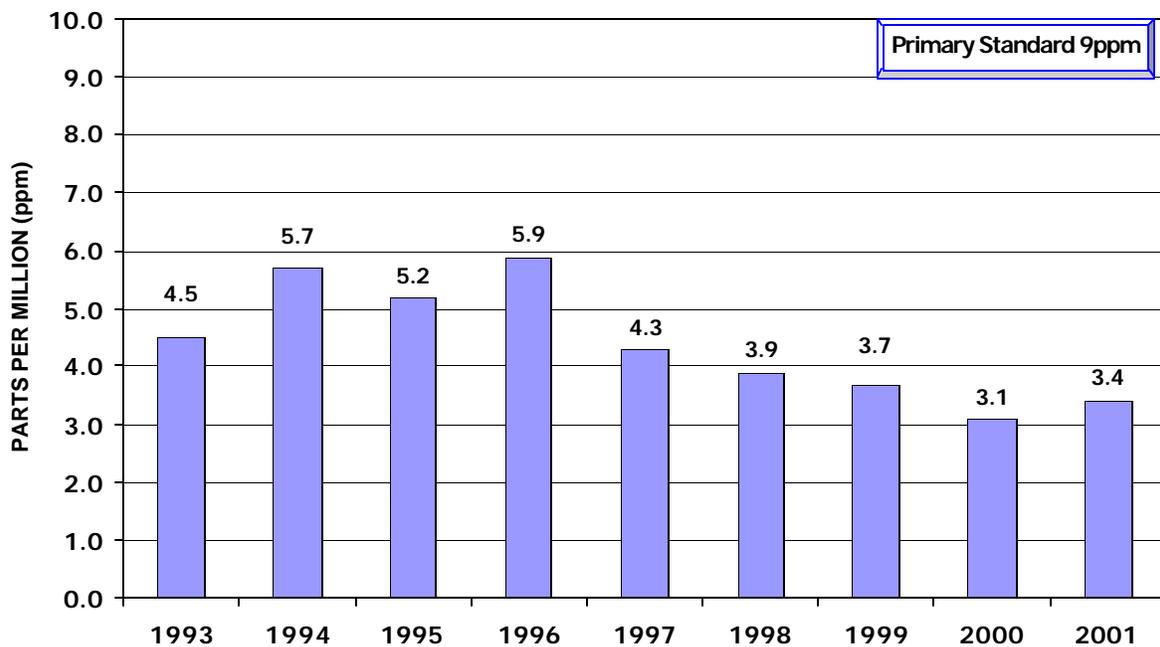
**VIRGINIA 2001  
CARBON MONOXIDE CONCENTRATIONS IN RANGES  
METHOD 51 AND 67 - NONDISPERSIVE INFRA-RED  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 8-HR. OBS.	NUMBER OF 8-HOUR CONCENTRATIONS IN RANGES								
		0 to 4	5 to 8	9 to 12	13 to 16	17 to 20	21 to 24	25 to 28	>28	
<b>WEST CENTRAL REGION</b>										
ROANOKE Carver Road	109-J 8623	8623	0	0	0	0	0	0	0	0
<b>PIEDMONT REGION</b>										
RICHMOND Forest Hill Fire Station	158-U 8743	8743	0	0	0	0	0	0	0	0
RICHMOND Science Museum of VA	158-W 8742	8742	0	0	0	0	0	0	0	0
<b>TIDEWATER REGION</b>										
HAMPTON Va. School for the Deaf & Blind	179-C 8597	8597	0	0	0	0	0	0	0	0
NORFOLK Post Office Garage	181-V 8690	8685	5	0	0	0	0	0	0	0
NORFOLK Norfolk State University	181-Z 8680	8680	0	0	0	0	0	0	0	0

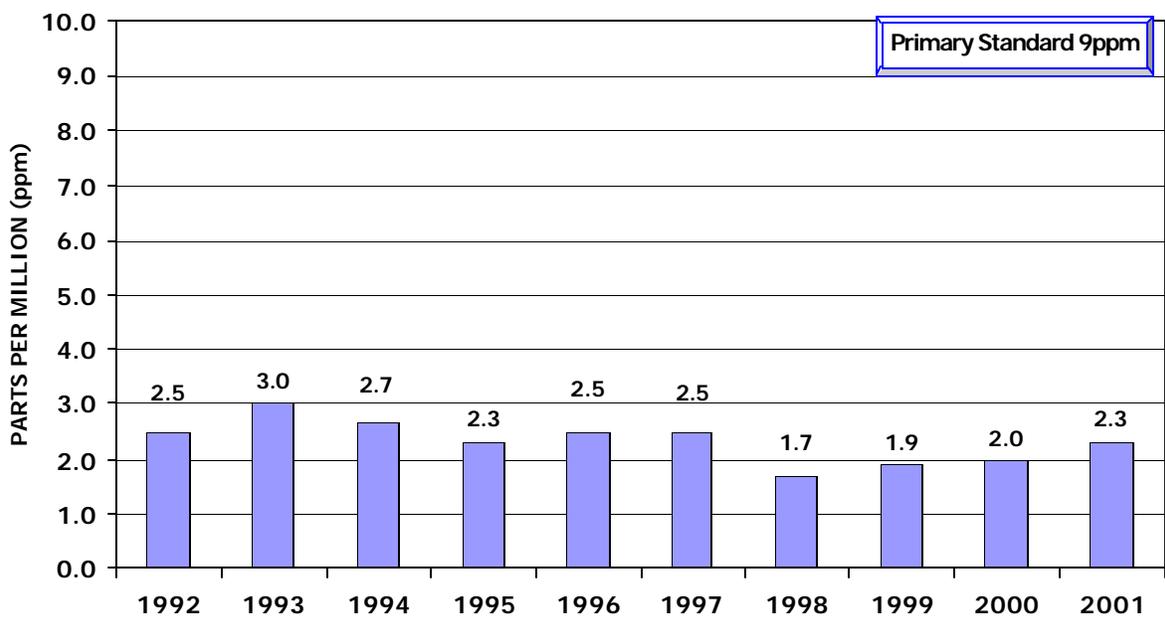
**VIRGINIA 2001  
CARBON MONOXIDE CONCENTRATIONS IN RANGES  
METHOD 51 AND 54 - NONDISPERSIVE INFRA-RED  
Parts Per Million (ppm)**

REGION/LOCATION STATION NO.	NO. 8-HR. OBS.	NUMBER OF 8-HOUR CONCENTRATIONS IN RANGES								
		0 to 4	5 to 8	9 to 12	13 to 16	17 to 20	21 to 24	25 to 28	>28	
<b>NORTHERN REGION</b>										
ARLINGTON CO.      47-T Aurora Hills Visitors Center	8561	8561	0	0	0	0	0	0	0	0
FRANCONIA            46-B9 Lee District Park	8610	8610	0	0	0	0	0	0	0	0
<b>ALEXANDRIA</b>										
ALEXANDRIA          L-126-C 517 N. St. Asaph St.	8646	8646	0	0	0	0	0	0	0	0
<b>FAIRFAX COUNTY</b>										
FAIRFAX CO.          L-46-A8 1437 Balls Hill Road	8675	8675	0	0	0	0	0	0	0	0
FAIRFAX CO.          L-46-F Upper Cub Run Treatment Plt.	8364	8364	0	0	0	0	0	0	0	0

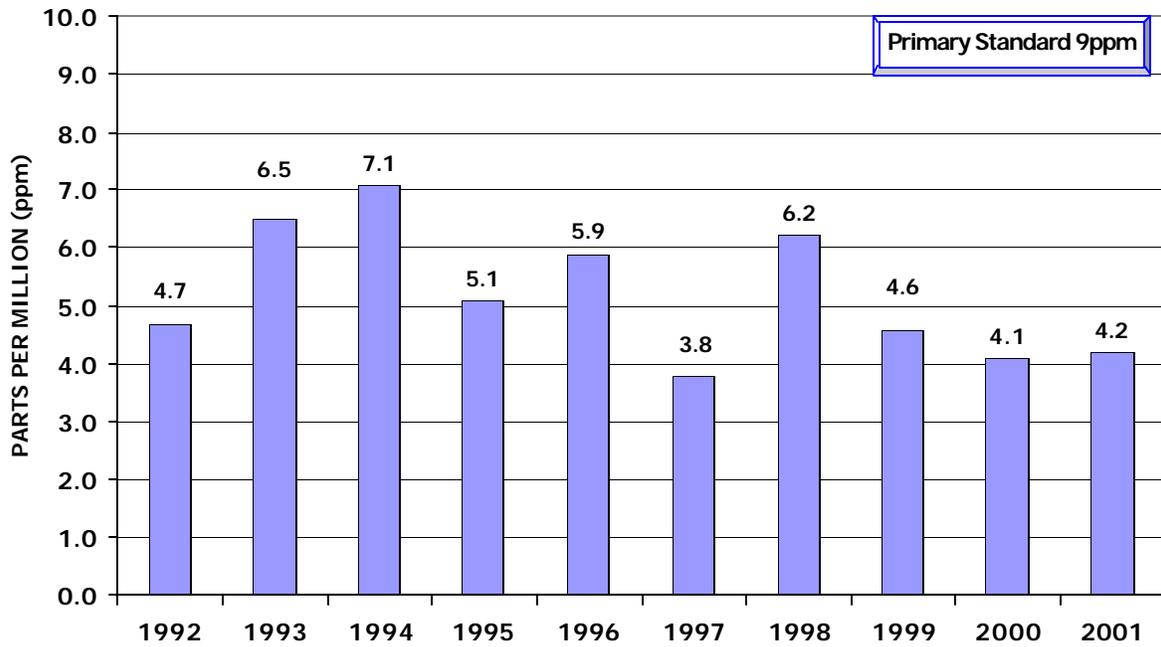
**CARBON MONOXIDE, WEST CENTRAL**  
**EIGHT HOUR 2ND MAXIMUM**  
**109-J, Carver Road, Roanoke**



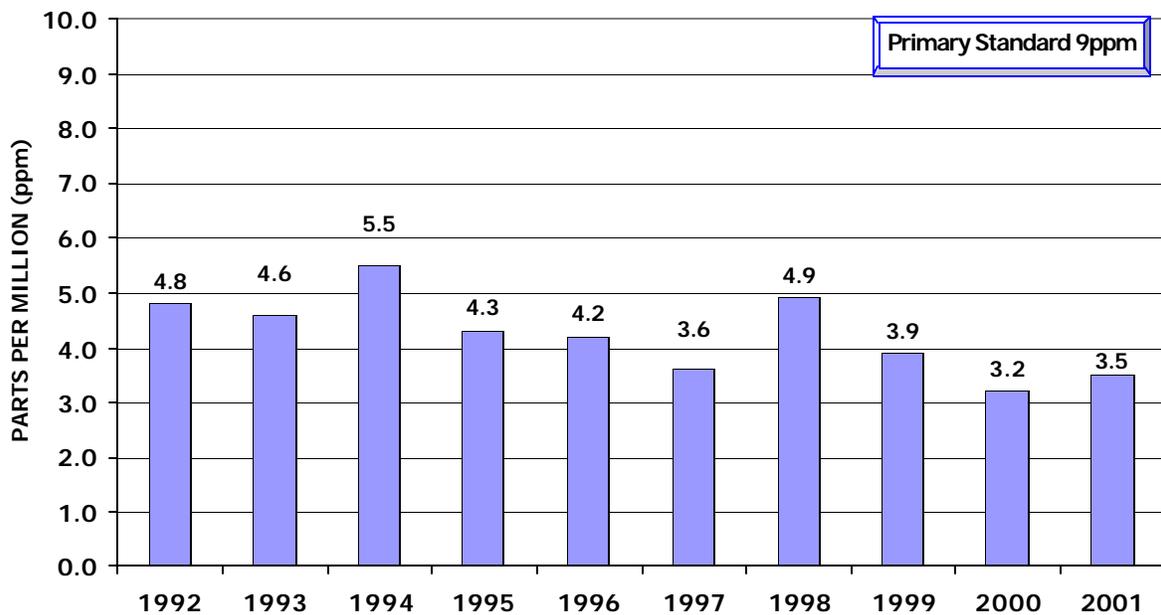
**CARBON MONOXIDE, PIEDMONT REGION**  
**EIGHT HOUR 2ND MAXIMUM**  
**158-U, Forest Hill Fire Station, Richmond**



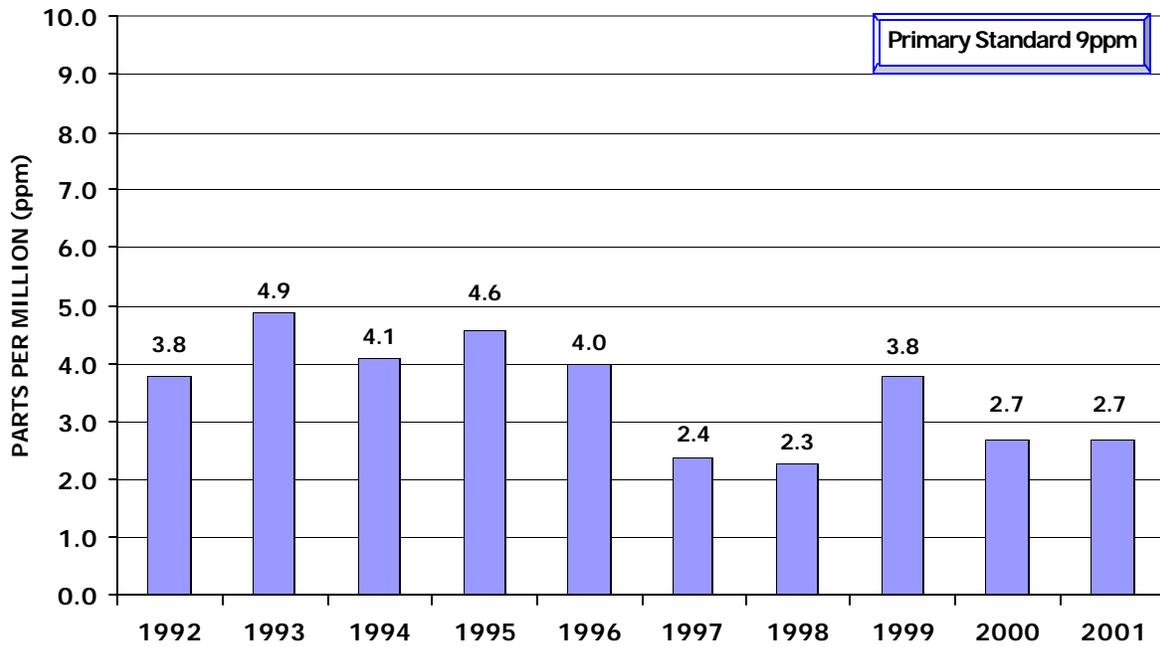
**CARBON MONOXIDE, TIDEWATER REGION  
EIGHT HOUR 2ND MAXIMUM  
181-V, Post Office, Norfolk**



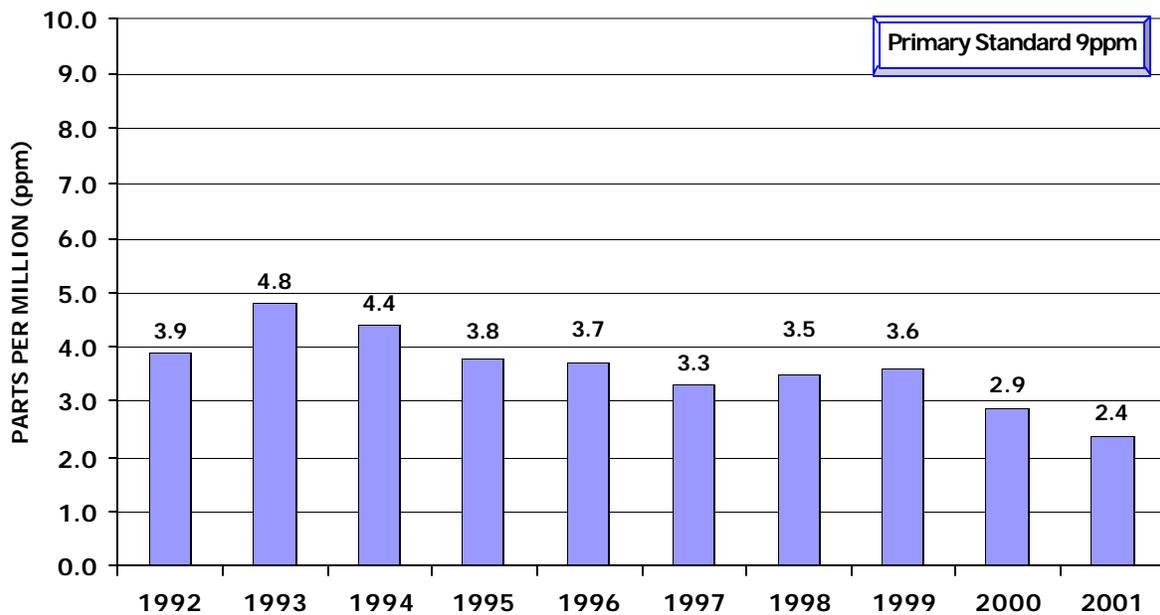
**CARBON MONOXIDE, TIDEWATER REGION  
EIGHT HOUR 2ND MAXIMUM  
181-Z, Norfolk State University, Norfolk**



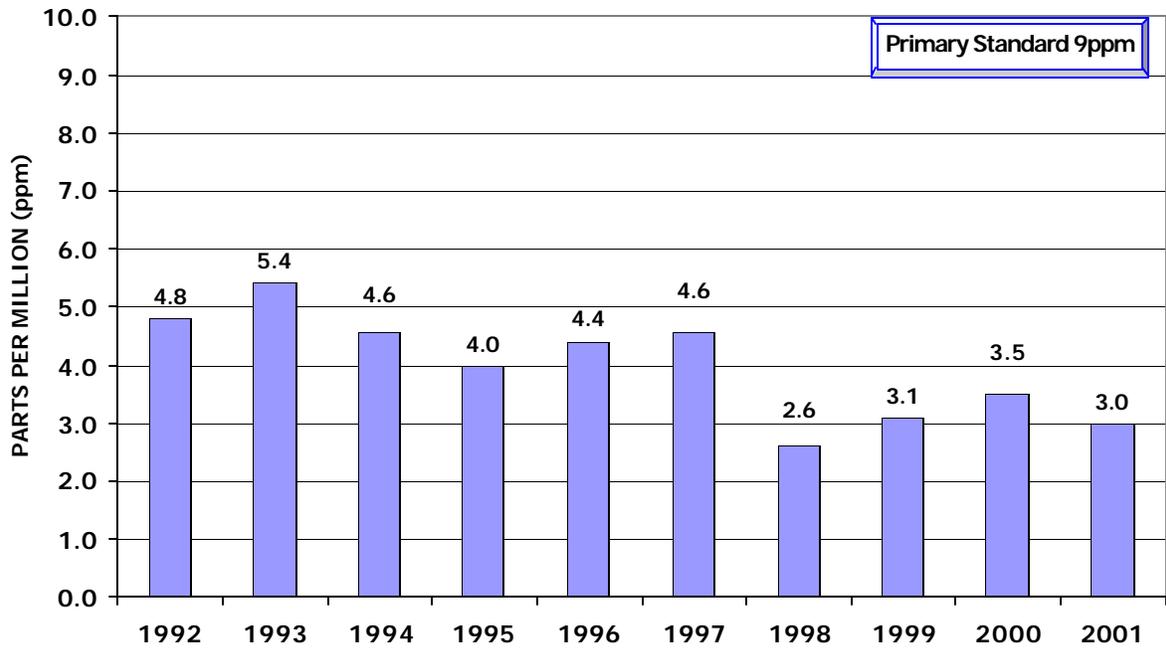
**CARBON MONOXIDE, NORTHERN REGION**  
**EIGHT HOUR 2ND MAXIMUM**  
47-T, Aurora Hills Visitor Center, Arlington County



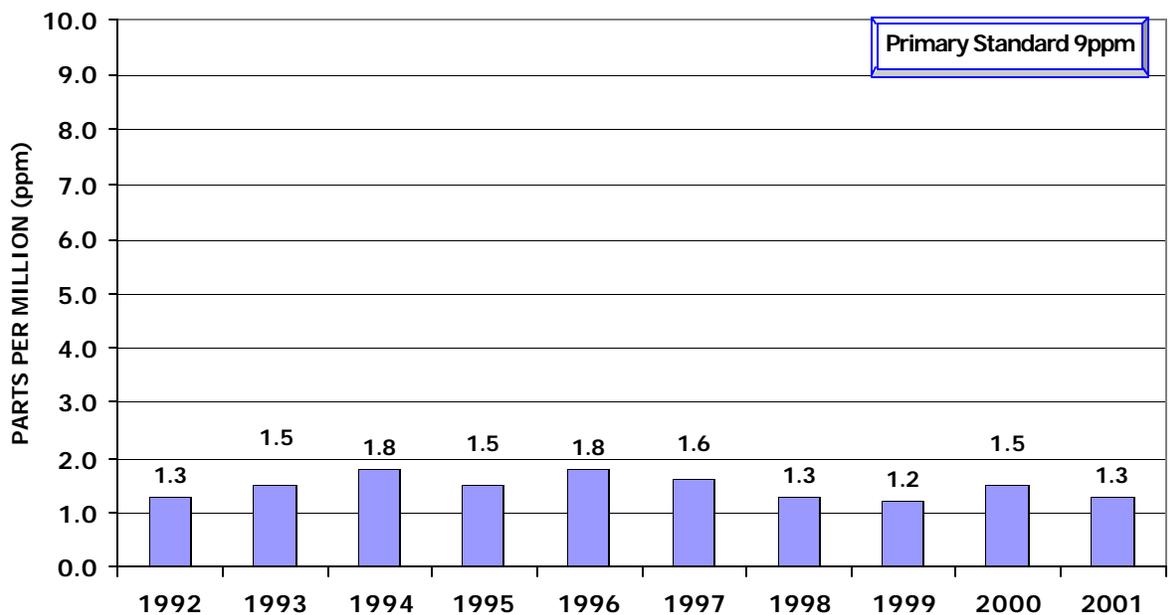
**CARBON MONOXIDE, ALEXANDRIA**  
**EIGHT HOUR 2ND MAXIMUM**  
L-126-C, 517 North Saint Asaph Street



**CARBON MONOXIDE, FAIRFAX COUNTY**  
**EIGHT HOUR 2ND MAXIMUM**  
L-46-A8, McLean



**CARBON MONOXIDE, FAIRFAX COUNTY**  
**EIGHT HOUR 2ND MAXIMUM**  
L-46-F, Chantilly



# SO<sub>2</sub> MONITORING SITES



## Reporting Organizations

-  VA Department of Environmental Quality
-  Fairfax County Health Department

**SULFUR DIOXIDE** (SO<sub>2</sub>) results from combustion processes (mainly burning of fossil fuels containing sulfur compounds), refining of petroleum, manufacture of sulfuric acid, and smelting of ore containing sulfur. Once in the atmosphere, some sulfur dioxide can be oxidized (either photochemically or in the presence of a catalyst) to SO<sub>3</sub> (sulfur trioxide). With water vapor, SO<sub>3</sub> is converted to sulfuric acid mist. Other basic oxides combine with SO<sub>3</sub> to form sulfate aerosols. These compounds can be transported long distances and fall back to earth as acid rain. SO<sub>2</sub> causes chlorosis in plant leaves and in moist air forms acids that damage structural materials. Their irritating effects in the respiratory tract are magnified by high particulate levels.

Sulfur dioxide is measured continuously with a fluorescence analyzer. Air is drawn through a sample cell where it is subjected to high intensity ultraviolet light. Sulfur dioxide molecules in the air are excited and fluoresce, releasing light characteristic of SO<sub>2</sub>. The fluorescence is detected with a photomultiplier tube and converted to an electrical signal related to the SO<sub>2</sub> concentration.

**VIRGINIA 2001  
SULFUR DIOXIDE SUMMARY BY REGIONS  
METHOD 61 - ULTRAVIOLET FLUORESCENCE  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 24-HR OBS.	FIXED MIDNIGHT TO MIDNIGHT 24-HOUR AVERAGES						ANNUAL ARITHMETIC MEAN
		24-HR. MAX	DATE	24-HR. 2ND MAX	DATE	>.14		
<b>VALLEY REGION</b>								
ROCKINGHAM CO. Valley DEQ Office	26-E	363	.012	JAN 12	.011	OCT 31	0	.003
<b>WEST CENTRAL REGION</b>								
VINTON East Vinton Elementary School	19-A6	365	.012	JAN 12	.009	OCT 31	0	.003
<b>PIEDMONT REGION</b>								
CHARLES CITY CO. Route 608	75-B	364	.022	DEC 22	.019	NOV 15	0	.005
RICHMOND Science Museum	158-W	365	.017	JAN 14	.017	JAN 17	0	.005
<b>TIDEWATER REGION</b>								
HAMPTON Virginia School	179-C	365	.023	JAN 24	.018	JAN 11	0	.004
NORFOLK Norfolk State University	181-Z	365	.025	JAN 2	.023	JAN 24	0	.006

**VIRGINIA 2001**  
**SULFUR DIOXIDE SUMMARY BY REGIONS**  
**METHOD 009 - PULSED FLUORESCENT**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 24-HR OBS.	FIXED MIDNIGHT TO MIDNIGHT 24-HOUR AVERAGES					ANNUAL ARITHMETIC MEAN
		24-HR. MAX	DATE	24-HR. 2ND MAX	DATE	>.14	
<b>ALEXANDRIA</b>							
ALEXANDRIA L-126-C 517 North St. Asaph Street	365	.032	SEP 30	.022	JAN 12	0	.006
<b>FAIRFAX CO.</b>							
FAIRFAX CO. L-46-A8 1437 Balls Hill Road	362	.025	JAN 18	.024	JAN 29	0	.007
FAIRFAX CO. L-46-F Upper Cub Run Sewage Treatment Plant	359	.013	JAN 29	.012	JAN 3	0	.004

**VIRGINIA 2001  
SULFUR DIOXIDE SUMMARY BY REGIONS  
METHOD 61 - ULTRAVIOLET FLUORESCENCE  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR OBS.	3-HOUR BLOCK AVERAGES					ANNUAL ARITHMETIC MEAN
		3-HR. MAX	DATE	3-HR. 2ND MAX	DATE	>.5	
<b>VALLEY REGION</b>							
ROCKINGHAM CO. 26-E Valley DEQ Office	8580	.019	JAN 12 2:00 PM	.019	JAN 12 5:00 PM	0	.003
<b>WEST CENTRAL REGION</b>							
VINTON 19-A6 East Vinton Elementary School	8644	.017	JAN 12 5:00 PM	.017	JAN 12 8:00 PM	0	.003
<b>PIEDMONT REGION</b>							
CHARLES CITY CO. 75-B Route 608	8630	.065	DEC 22 5:00 PM	.056	APR 30 11:00 PM	0	.005
RICHMOND 158-W Science Museum	8671	.083	NOV 28 5:00 PM	.053	DEC 16 8:00 PM	0	.005
<b>TIDEWATER REGION</b>							
HAMPTON 179-C Virginia School	8610	.046	JAN 24 2:00 AM	.042	SEP 8 2:00 AM	0	.004
NORFOLK 181-Z Norfolk State University	8605	.061	OCT 6 2:00 AM	.058	DEC 23 11:00 AM	0	.006

**VIRGINIA 2001  
SULFUR DIOXIDE SUMMARY BY REGIONS  
METHOD 009 - PULSED FLUORESCENT  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR OBS.	3-HOUR BLOCK AVERAGES						ANNUAL ARITHMETIC MEAN
		3-HR. MAX	DATE	3-HR. 2ND MAX	DATE	>.5		
<b>ALEXANDRIA</b>								
ALEXANDRIA L-126-C 517 North St. Asaph Street	8605	.093	MAY 1 11:00 AM	.079	JUN 6 2:00 PM	0	.006	
<b>FAIRFAX CO.</b>								
FAIRFAX CO. L-46-A8 1437 Balls Hill Road	8644	.047	JAN 18 8:00 AM	.042	JAN 29 8:00 AM	0	.007	
FAIRFAX CO. L-46-F Upper Cub Run Treatment Plant	8582	.023	JAN 3 2:00 AM	.022	JAN 29 11:00 AM	0	.004	

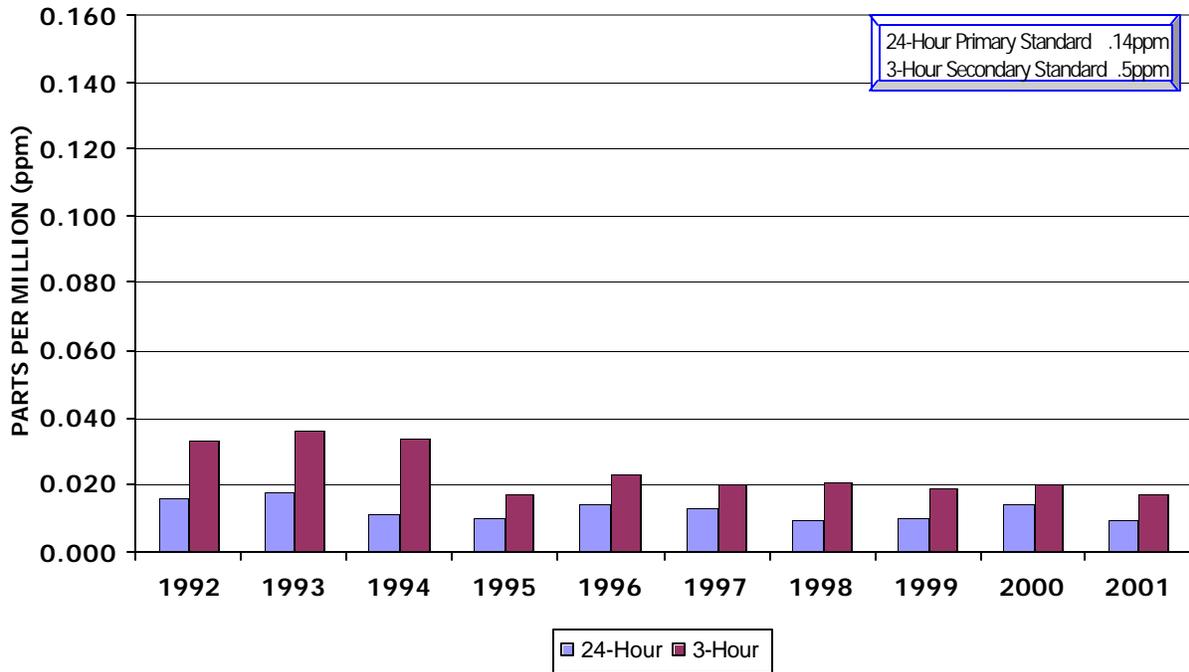
**VIRGINIA 2001**  
**SULFUR DIOXIDE CONCENTRATIONS IN RANGES**  
**METHOD 61 - ULTRAVIOLET FLUORESCENCE**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NUMBER OF 24-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
		<b>VALLEY REGION</b>								
ROCKINGHAM CO.      26-E Valley DEQ Office	363	363	0	0	0	0	0	0	0	0
<b>WEST CENTRAL REGION</b>										
VINTON                      19-A6 East Vinton Elementary School	365	365	0	0	0	0	0	0	0	0
<b>PIEDMONT REGION</b>										
CHARLES CITY CO.      75-B Route 608	364	364	0	0	0	0	0	0	0	0
RICHMOND                158-W Science Museum	365	365	0	0	0	0	0	0	0	0
<b>TIDEWATER REGION</b>										
HAMPTON                 179-C Virginia School	365	365	0	0	0	0	0	0	0	0
NORFOLK                 181-Z Norfolk State University	365	365	0	0	0	0	0	0	0	0

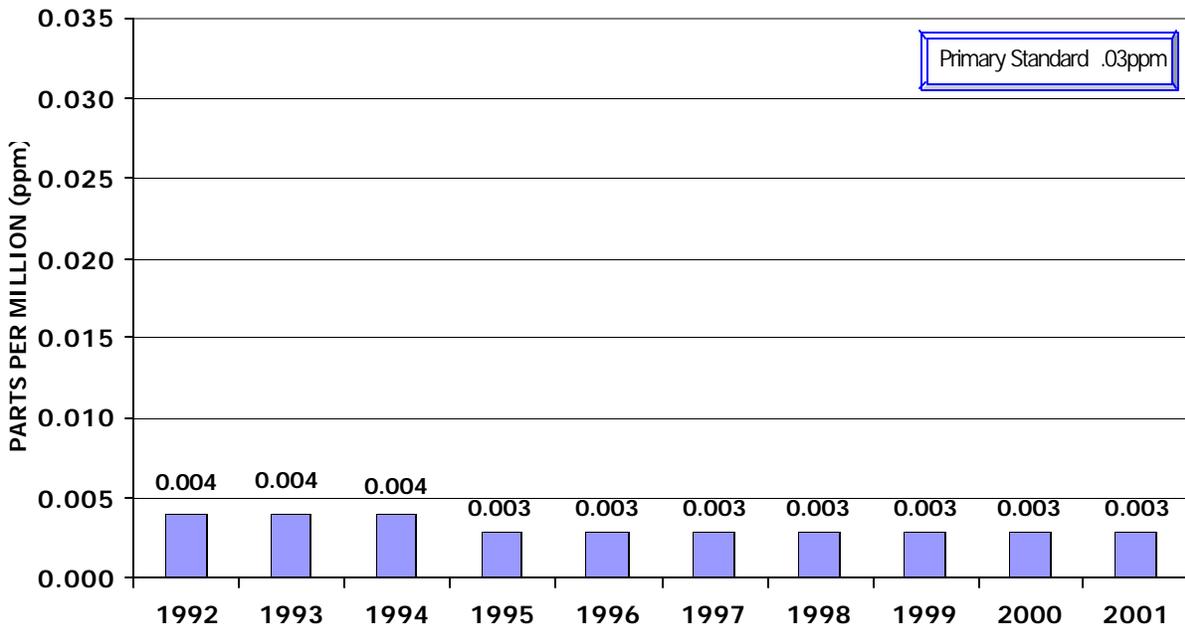
**VIRGINIA 2001**  
**SULFUR DIOXIDE zCONCENTRATIONS IN RANGES**  
**METHOD 009 - PULSED FLUORESCENT**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NUMBER OF 24-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
<b>ALEXANDRIA</b>										
ALEXANDRIA L-126-C 517 North St. Asaph Street	365	365	0	0	0	0	0	0	0	0
<b>FAIRFAX COUNTY</b>										
FAIRFAX CO. L-46-A8 1437 Balls Hill Road	362	362	0	0	0	0	0	0	0	0
FAIRFAX CO. L-46-F Upper Cub Run Sewage Treatment Plant	359	359	0	0	0	0	0	0	0	0

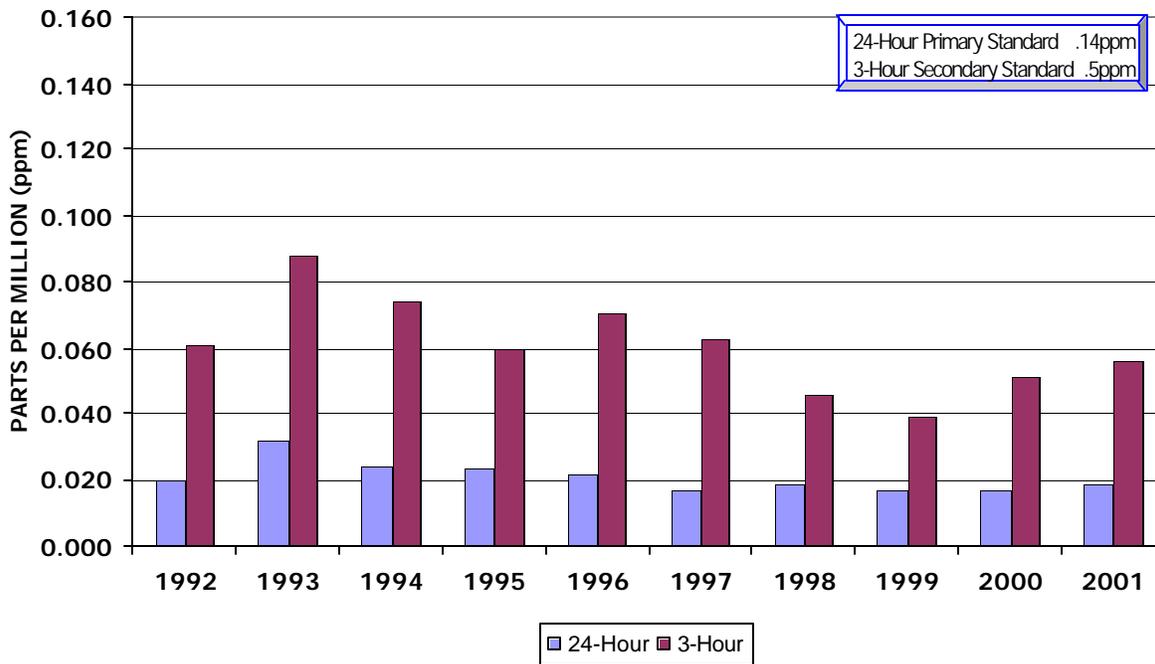
**SULFUR DIOXIDE, WEST CENTRAL REGION  
2ND MAXIMUM VALUE  
19-A6, Vinton Elementary School**



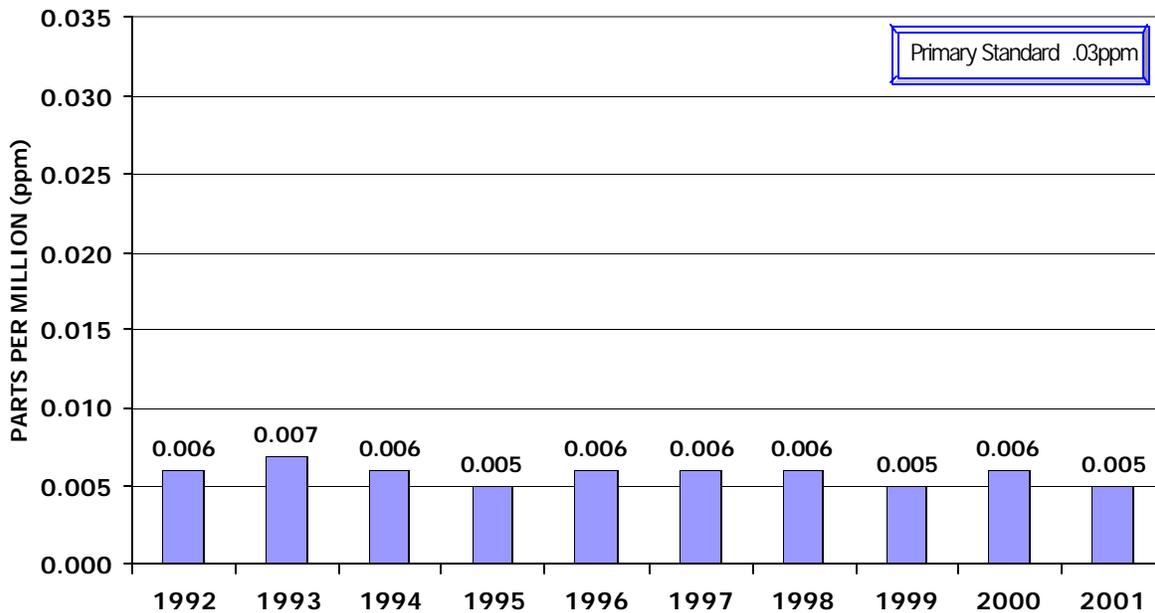
**SULFUR DIOXIDE, WEST CENTRAL REGION  
ANNUAL ARITHMETIC MEAN  
19-A6, Vinton Elementary School, Vinton**



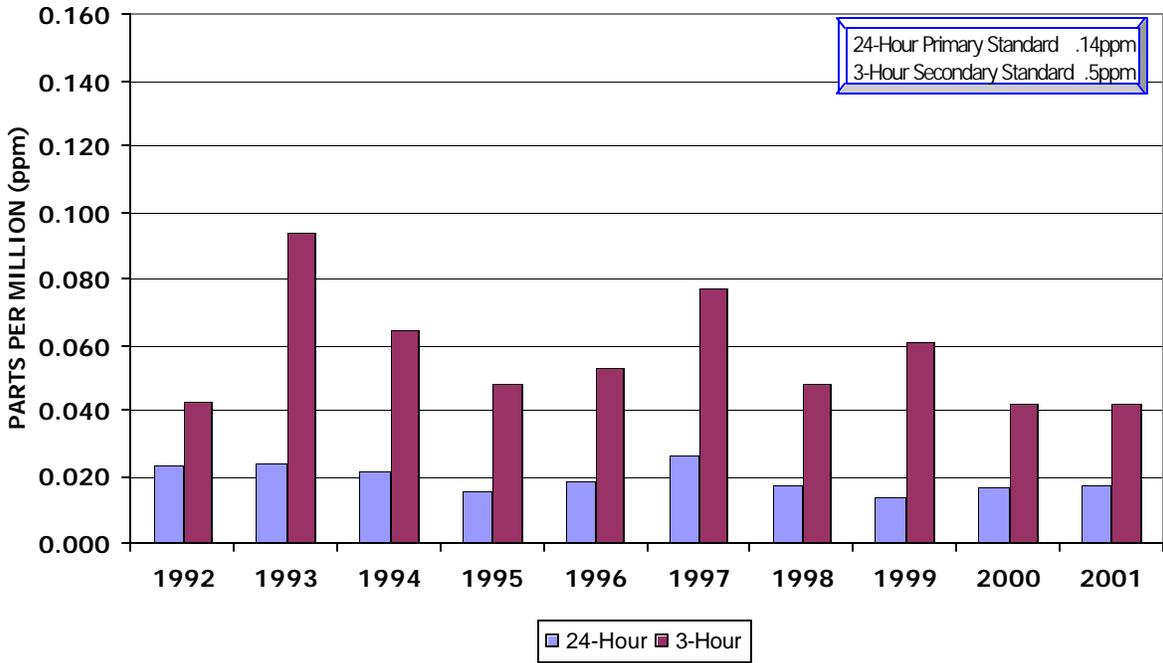
**SULFUR DIOXIDE, PIEDMONT REGION**  
**2ND MAXIMUM VALUE**  
**75-B, Charles City County**



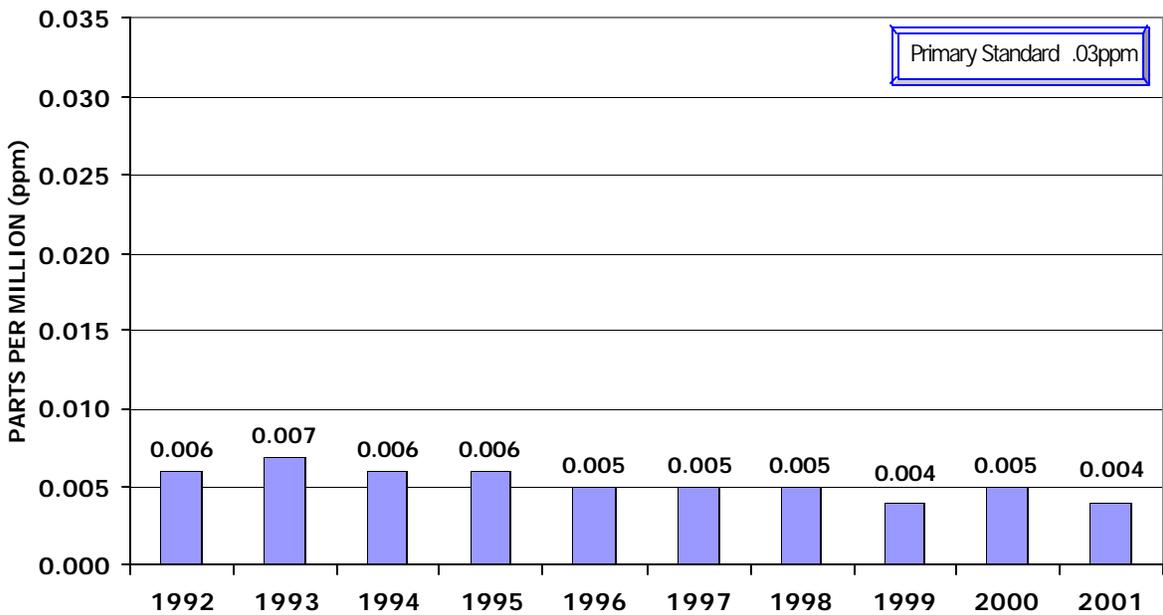
**SULFUR DIOXIDE, PIEDMONT REGION**  
**ANNUAL ARITHMETIC MEAN**  
**75-B, Charles City County**



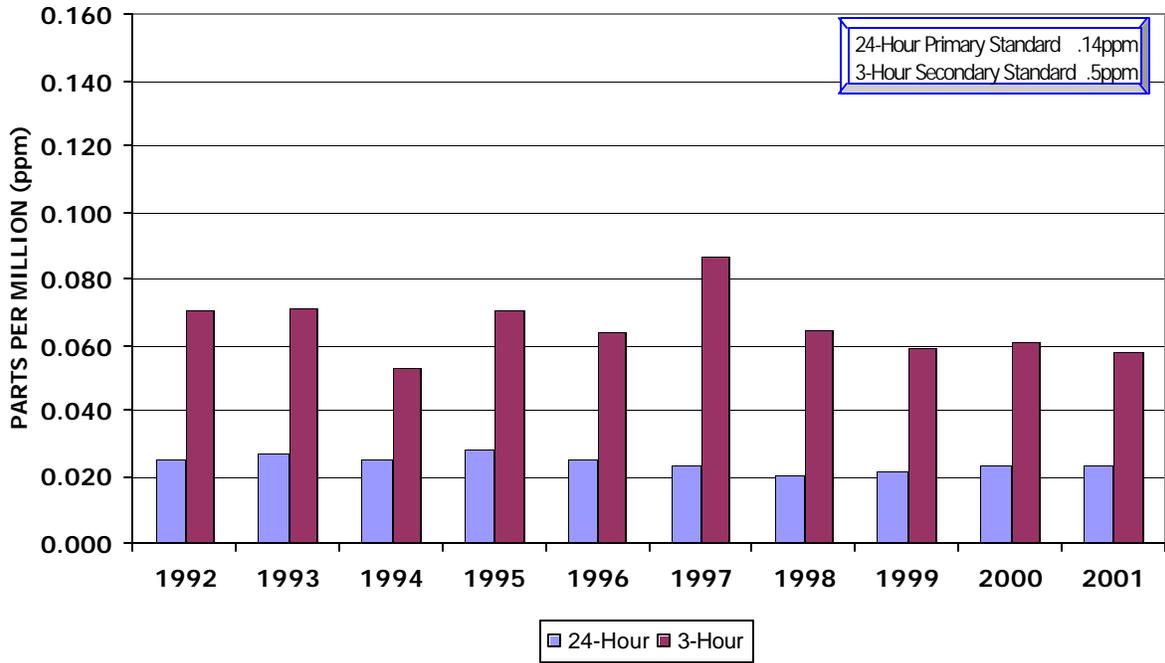
**SULFUR DIOXIDE, TIDEWATER REGION**  
**2ND MAXIMUM VALUE**  
**179-C, Virginia School, Hampton**



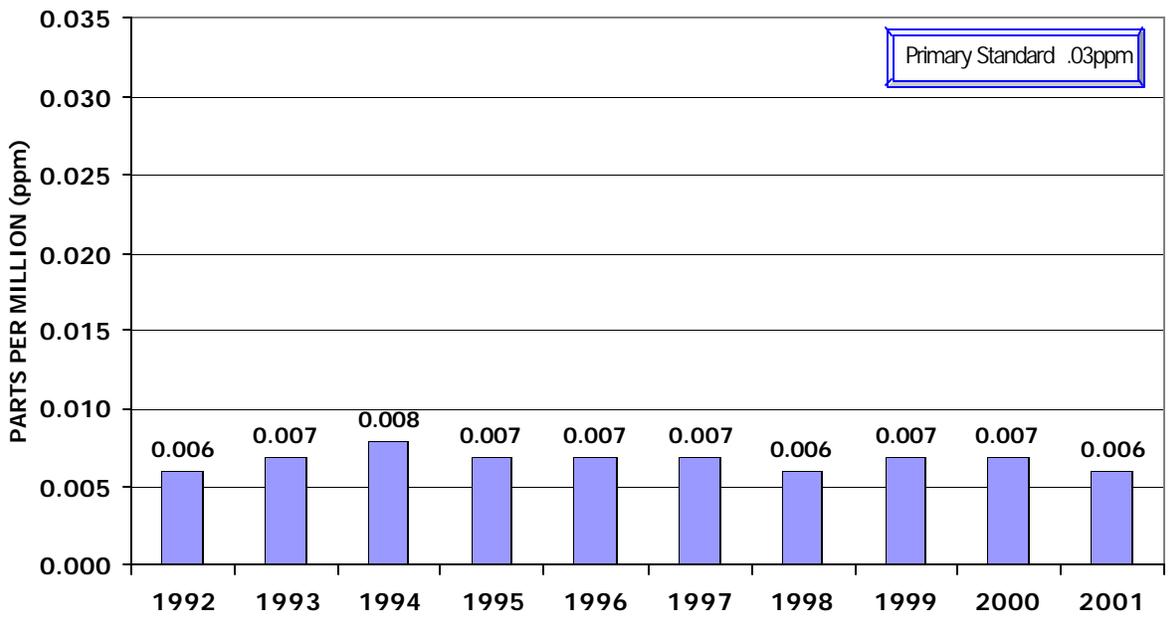
**SULFUR DIOXIDE, TIDEWATER REGION**  
**ANNUAL ARITHMETIC MEAN**  
**179-C, Virginia School, Hampton**

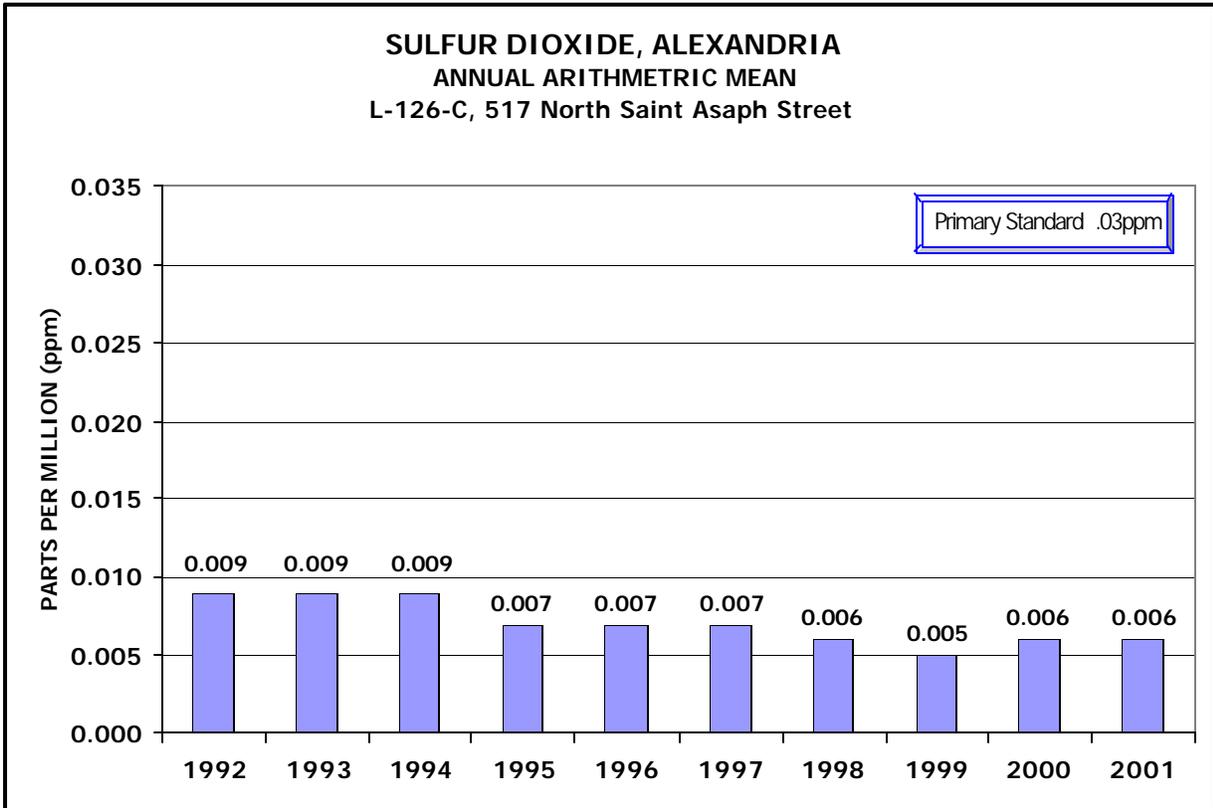
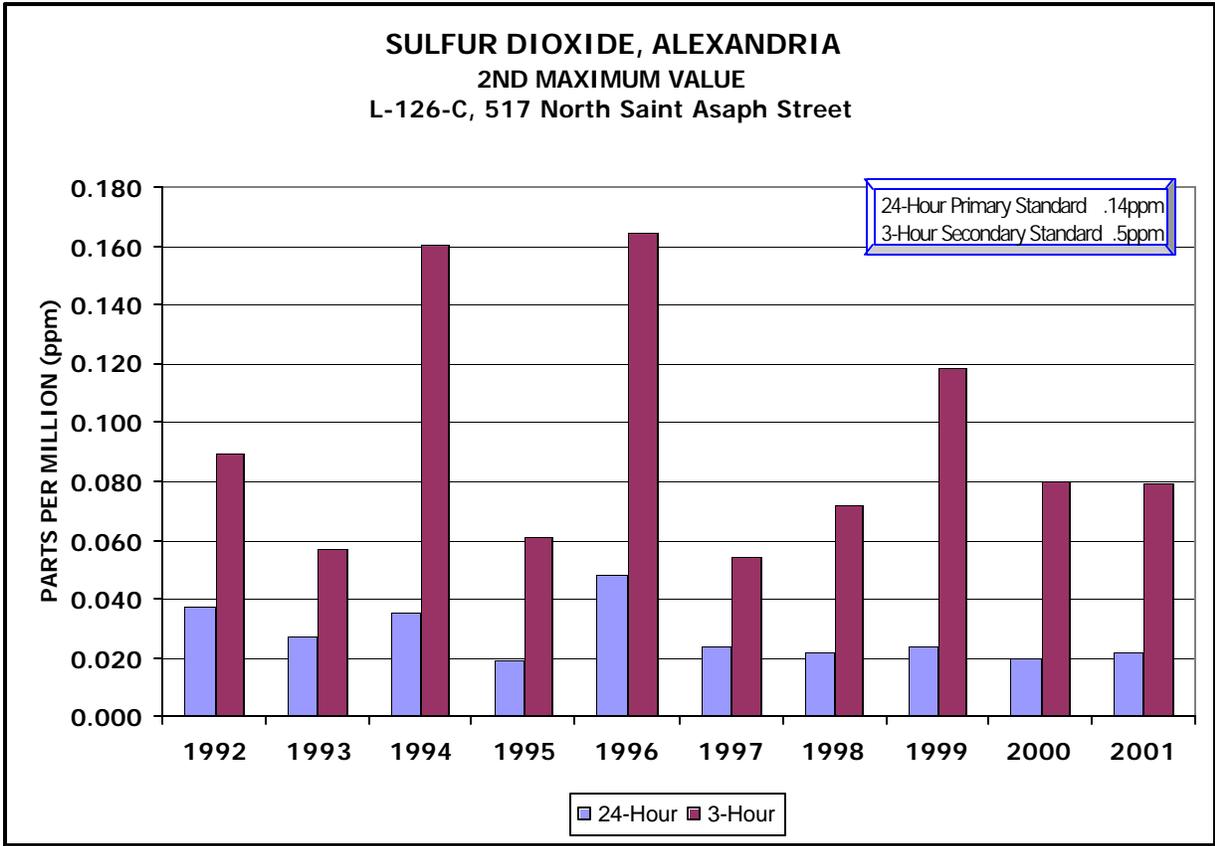


**SULFUR DIOXIDE, TIDEWATER REGION  
2ND MAXIMUM VALUE  
181-Z, Norfolk State University, Norfolk**

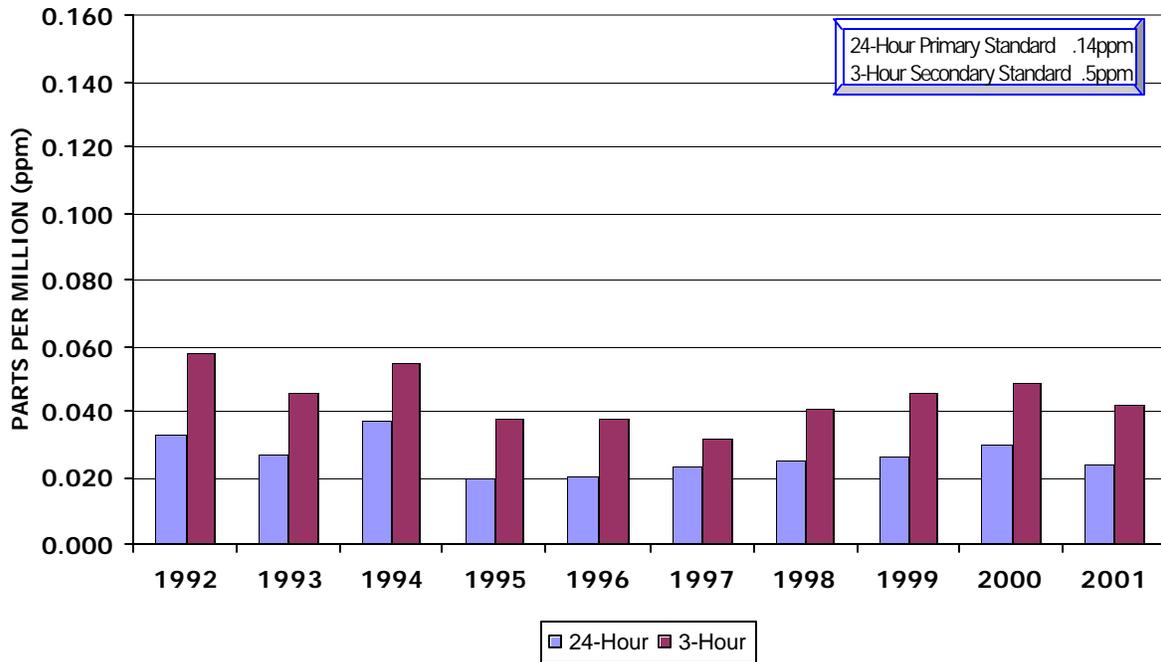


**SULFUR DIOXIDE, TIDEWATER REGION  
ANNUAL ARITHMETIC MEAN  
181-Z, Norfolk State University, Norfolk**

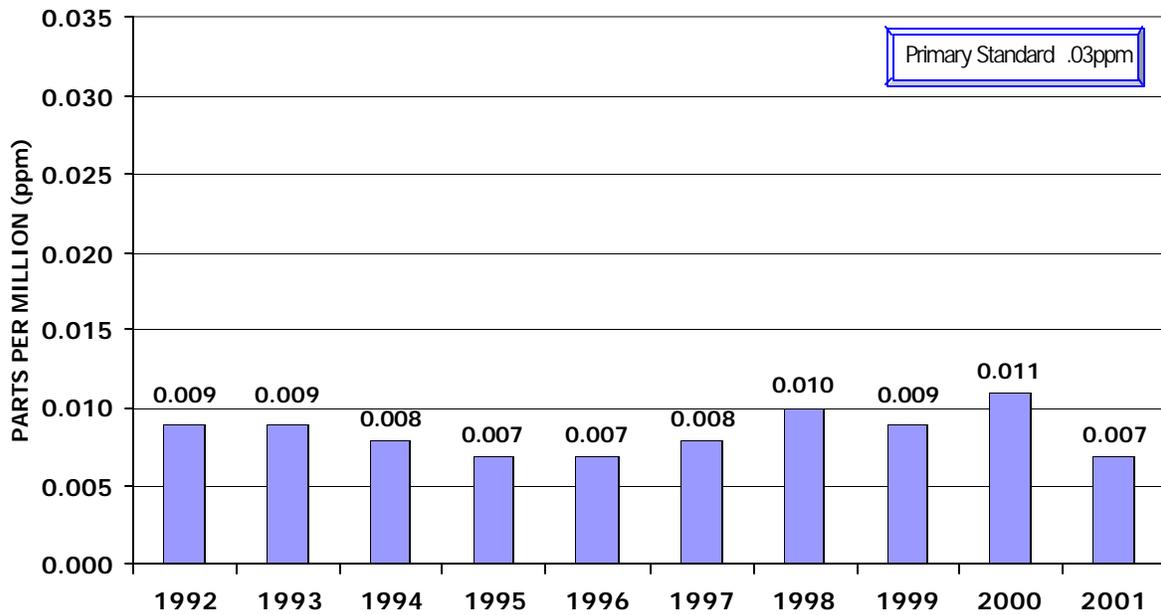




**SULFUR DIOXIDE, FAIRFAX COUNTY**  
**2ND MAXIMUM VALUE**  
 L-46-A8, McLean Governmental Center, Fairfax County



**SULFUR DIOXIDE, FAIRFAX COUNTY**  
**ANNUAL ARITHMETIC MEAN**  
 L-46-A8, McLean Governmental Center, Fairfax County



# NO<sub>2</sub> MONITORING SITES



## Reporting Organizations

- ★ VA Department of Environmental Quality
- ★ Fairfax County Health Department

**NITROGEN DIOXIDE** (NO<sub>2</sub>), a secondary derivative of atmospheric nitric oxide, is formed when combustion temperatures are extremely high, as in the burning of coal, oil, gas, and gasoline, and has been clearly established as exerting detrimental effect on human health and welfare. NO<sub>2</sub> in high concentrations can cause impairment of dark adaptation, increase airway resistance and respiratory rate, and enhance susceptibility to respiratory infections.

Nitrogen oxides (NO, NO<sub>2</sub>, NO<sub>x</sub>) are measured continuously using the chemiluminescent reaction of nitric oxide (NO) with ozone (O<sub>3</sub>). Air is drawn through the analyzer continuously, and mixed with a high concentration of ozone in a reaction chamber. Any NO in the air reacts with the ozone to produce NO<sub>2</sub> which releases light having a characteristic spectrum. The light resulting from the reaction is detected with a photomultiplier tube, and converted to an electrical signal reflecting the NO concentration. Total nitrogen oxides (NO<sub>x</sub>) are measured by passing the air through a converter where any NO<sub>2</sub> in the air is reduced to NO before passing the air on to the reaction chamber. By alternately passing the air directly to the reaction chamber, and through the converter before the reaction chamber, the analyzer alternately measures NO and NO<sub>x</sub>. The NO<sub>2</sub> concentration is the difference between NO and NO<sub>x</sub>.

**VIRGINIA 2001  
NITROGEN DIOXIDE SUMMARY BY REGION  
METHOD 25 AND 74 - CHEMILUMINESCENCE  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HOUR OBS.	HOURLY VALUES						
		1-HR. MAX	DATE TIME	1-HOUR 2ND MAX	DATE TIME	ANNUAL ARITHMETIC MEAN	ANNUAL MEAN >.05	
<b>WEST CENTRAL REGION</b>								
VINTON East Vinton Elementary School	19-A6 8623	.057	APR 28 MIDNIGHT	.056	NOV 15 9:00 PM	.014	0	
<b>PIEDMONT REGION</b>								
CHARLES CITY CO. Route 608	75-B 8544	.077	MAR 6 9:00 AM	.076	JUL 10 8:00 PM	.012	0	
RICHMOND Science Museum	158-W 8528	.094	MAR 16 2:00 PM	.073	OCT 22 6:00 PM	.021	0	
<b>TIDEWATER REGION</b>								
NORFOLK Norfolk State University	181-Z 8502	.073	APR 24 10:00 AM	.071	MAR 24 MIDNIGHT	.018	0	
<b>NORTHERN REGION</b>								
ASHBURN Broad Run High School	38-I 8565	.054	OCT 22 8:00 PM	.052	FEB 20 6:00 PM	.014	0	
ARLINGTON CO. Aurora Hills Visitors Center	47-T 7741	.074	NOV 15 11:00 AM	.069	NOV 16 9:00 AM	.022	0	

**VIRGINIA 2001  
NITROGEN DIOXIDE SUMMARY BY REGION  
METHOD 25 AND 35 - CHEMILUMINESCENCE  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HOUR OBS.	HOURLY VALUES					
		1-HR. MAX	DATE TIME	1-HOUR 2ND MAX	DATE TIME	ANNUAL ARITHMETIC MEAN	ANNUAL MEAN >.05
<b>NORTHERN REGION (cont.)</b>							
PRINCE WILLIAM CO.      45-L Long Park	8627	.053	MAY 3 7:00 PM	.052	MAY 2 7:00 PM	.011	0
CAROLINE CO.              48-A U.S.G.S. Geomagnetic Center	8409	.036	JAN 13 3:00 AM	.036	JAN 24 3:00 AM	.006	0
<b>ALEXANDRIA</b>							
ALEXANDRIA              L-126-C 517 North St. Asaph Street	8581	.086	JAN 24 7:00 AM	.083	JUN 28 9:00 PM	.023	0
<b>FAIRFAX CO.</b>							
FAIRFAX CO.              L-46-A8 1437 Balls Hill Road	8227	.078	JUN 18 8:00 PM	.074	NOV 16 8:00 AM	.020	0
FAIRFAX CO.              L-46-F Upper Cub Run Treatment Plant	8563	.047	APR 5 8:00 AM	.046	APR 5 7:00 AM	.009	0

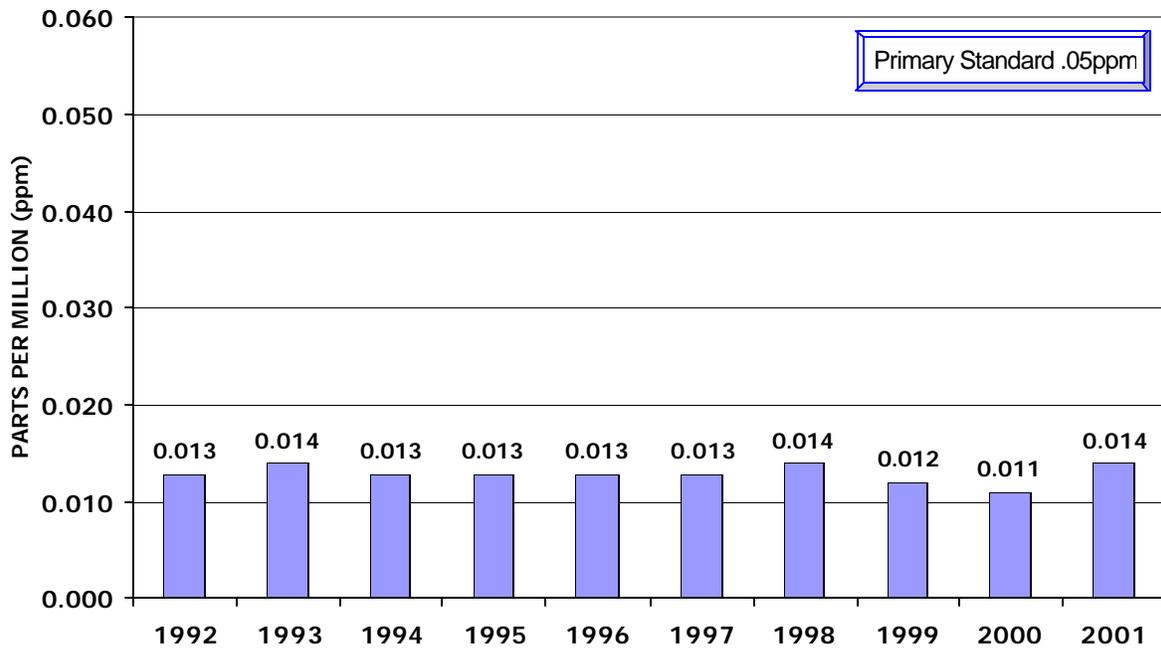
**VIRGINIA 2001  
NITROGEN DIOXIDE CONCENTRATION BY REGION  
METHOD 25 AND 74 - CHEMILUMINESCENCE  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR. OBS.	NUMBER OF 1-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
<b>WEST CENTRAL REGION</b>										
VINTON East Vinton Elementary School	19-A6 8623	8575	48	0	0	0	0	0	0	0
<b>PIEDMONT REGION</b>										
CHARLES CITY CO. Route 608	75-B 8544	8470	74	0	0	0	0	0	0	0
RICHMOND Science Museum	158-W 8528	8225	302	1	0	0	0	0	0	0
<b>TIDEWATER REGION</b>										
NORFOLK Norfolk State University	181-Z 8502	8367	135	0	0	0	0	0	0	0
<b>NORTHERN REGION</b>										
ASHBURN Broad Run High School	38-I 8565	8551	14	0	0	0	0	0	0	0
ARLINGTON CO. Aurora Hills Visitors Center	47-T 7741	7349	392	0	0	0	0	0	0	0
PRINCE WILLIAM CO. Long Park	45-L 8627	8620	7	0	0	0	0	0	0	0

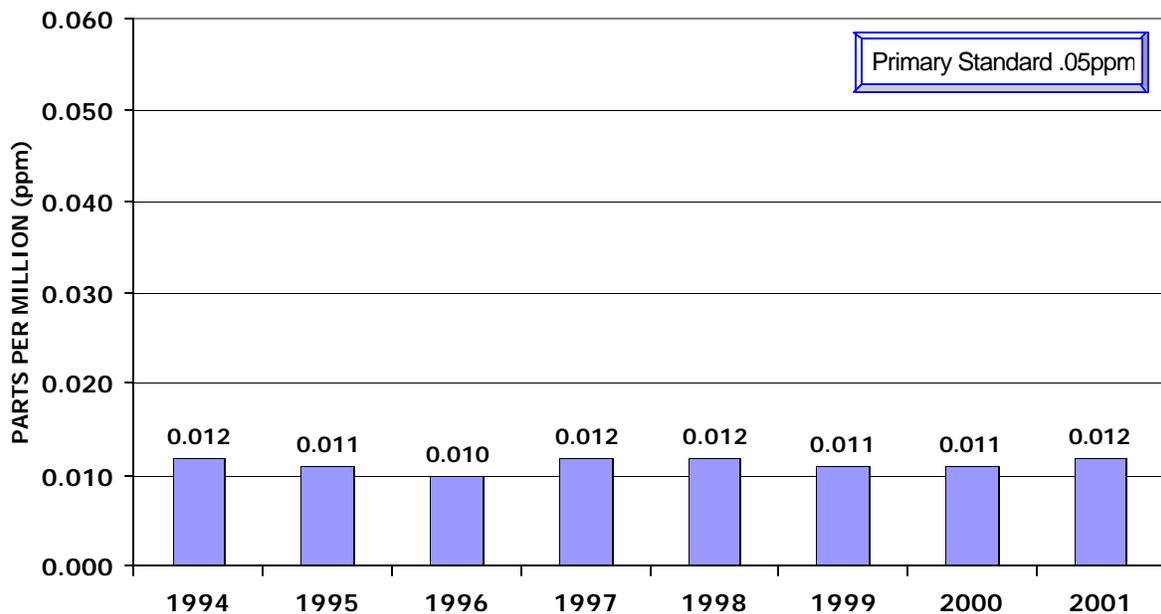
**VIRGINIA 2001  
 NITROGEN DIOXIDE CONCENTRATION BY REGION  
 METHOD 25 AND 35 - CHEMILUMINESCENCE  
 Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR. OBS.	NUMBER OF 1-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
		<b>NORTHERN REGION (cont.)</b>								
CAROLINE CO. Corbin	48-A	8409	8409	0	0	0	0	0	0	0
<b>ALEXANDRIA</b>										
ALEXANDRIA 517 North St. Asaph Street	L-126-C	8581	8178	402	1	0	0	0	0	0
<b>FAIRFAX COUNTY</b>										
FAIRFAX CO. 1437 Balls Hill Road	L-46-A8	8227	7902	325	0	0	0	0	0	0
FAIRFAX CO. Upper Cub Run Sewage Treatment Plant	L-46-F	8563	8561	2	0	0	0	0	0	0

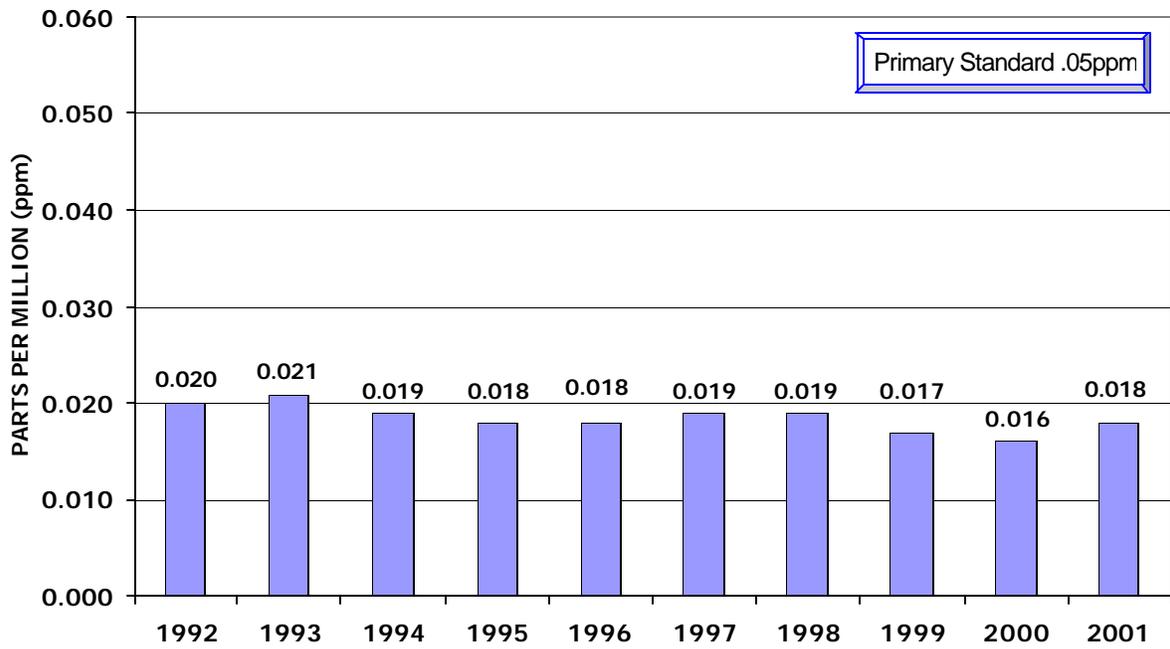
**NITROGEN DIOXIDE, WEST CENTRAL REGION**  
**ANNUAL ARITHMETRIC MEAN**  
**19-A6, Vinton Elementary School, Vinton**



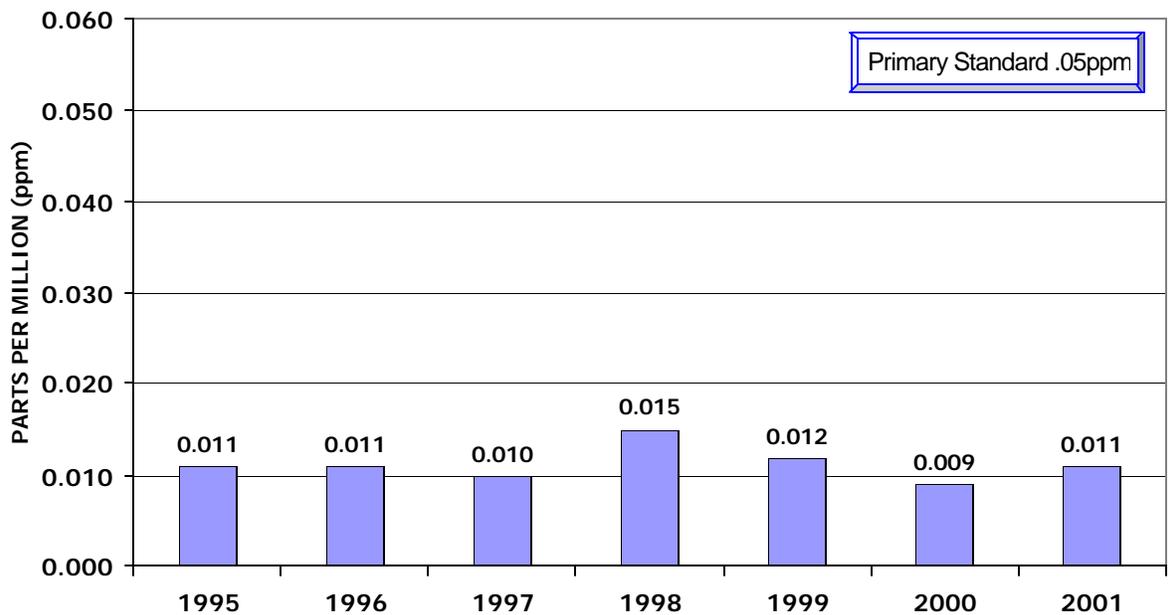
**NITROGEN DIOXIDE, PIEDMONT REGION**  
**ANNUAL ARITHMETRIC MEAN**  
**75-B, Charles City County**



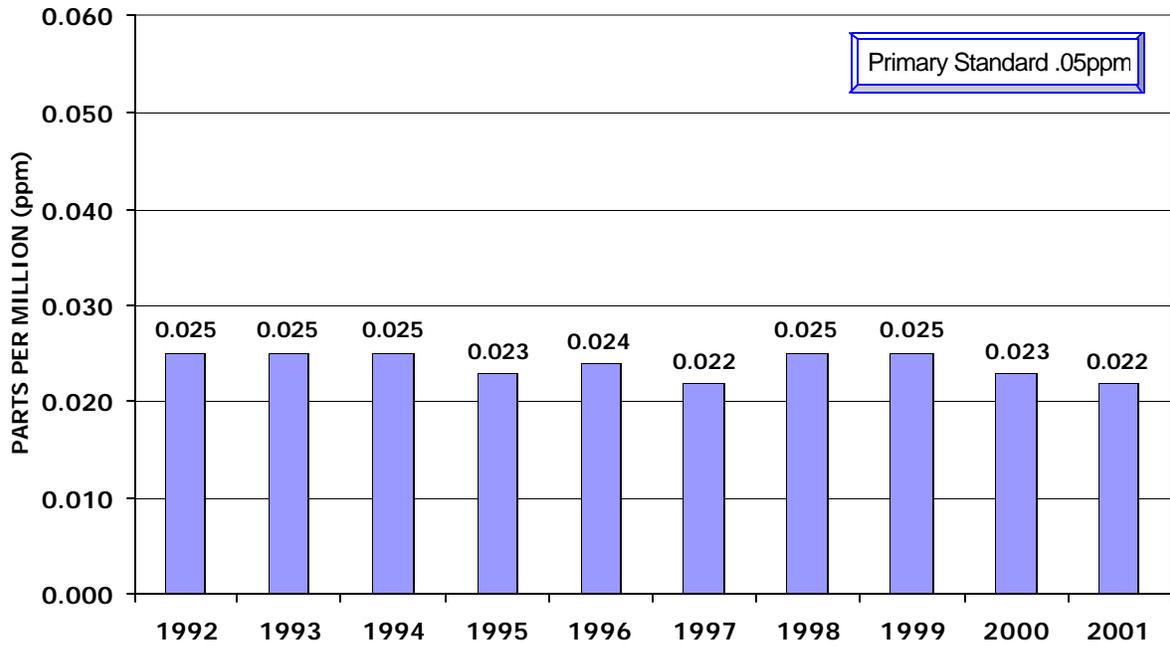
**NITROGEN DIOXIDE, TIDEWATER REGION**  
ANNUAL ARITHMETRIC MEAN  
181-Z, Norfolk State University, Norfolk



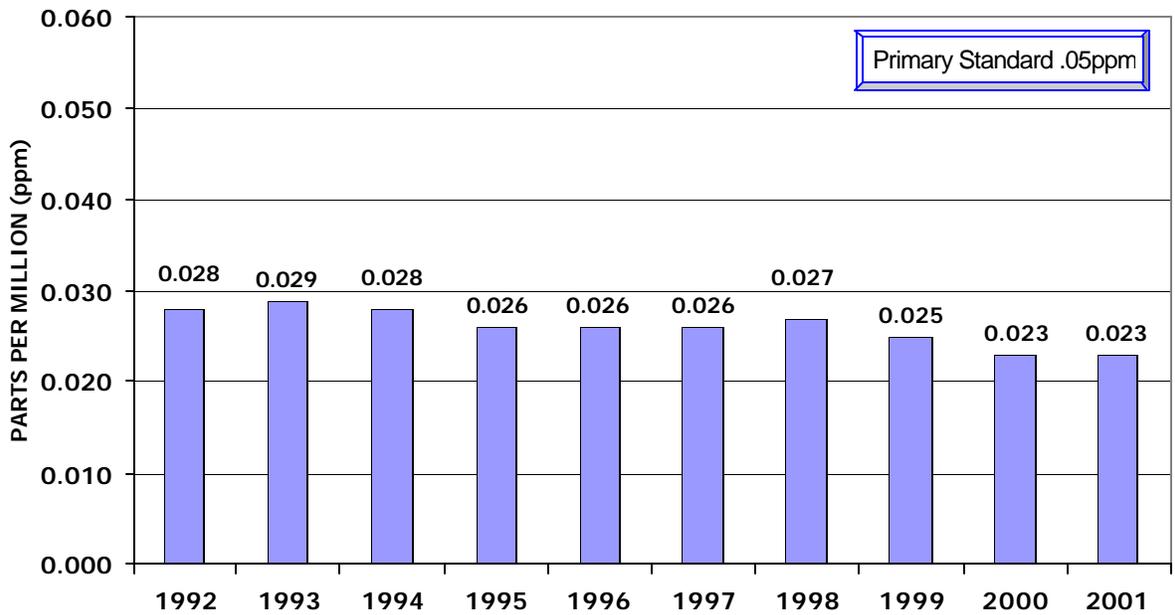
**NITROGEN DIOXIDE, NORTHERN REGION**  
ANNUAL ARITHMETRIC MEAN  
45-L, Long Park, Prince William County



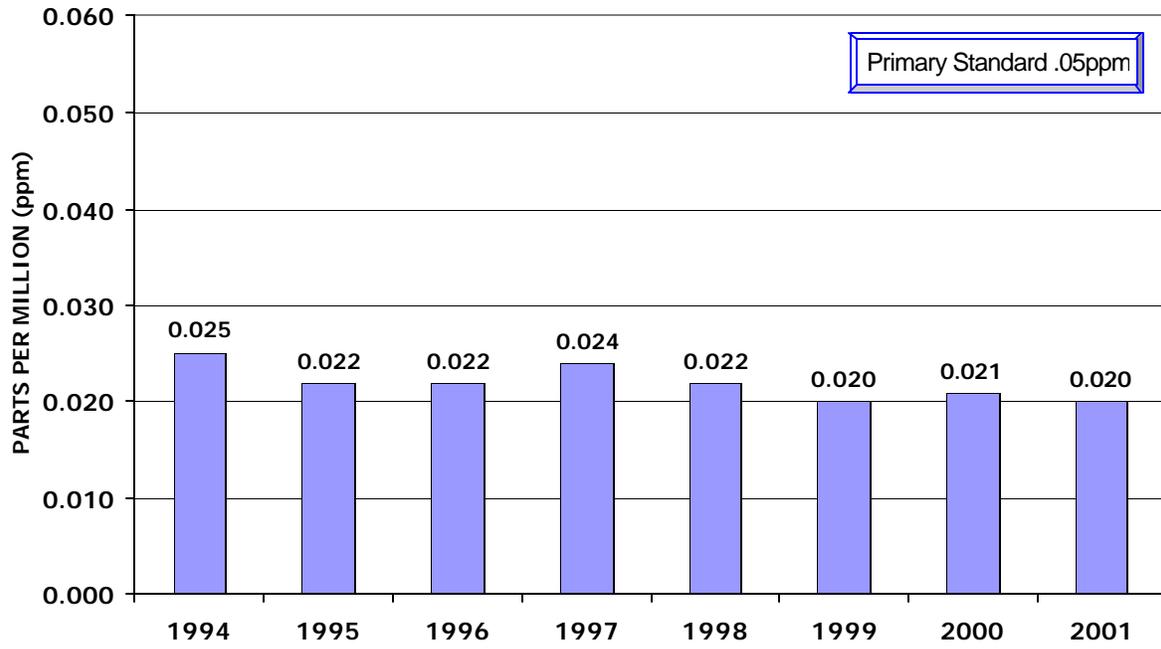
**NITROGEN DIOXIDE, NORTHERN REGION**  
**ANNUAL ARITHMETRIC MEAN**  
**47-T, Aurora Hills Visitors Center, Arlington County**



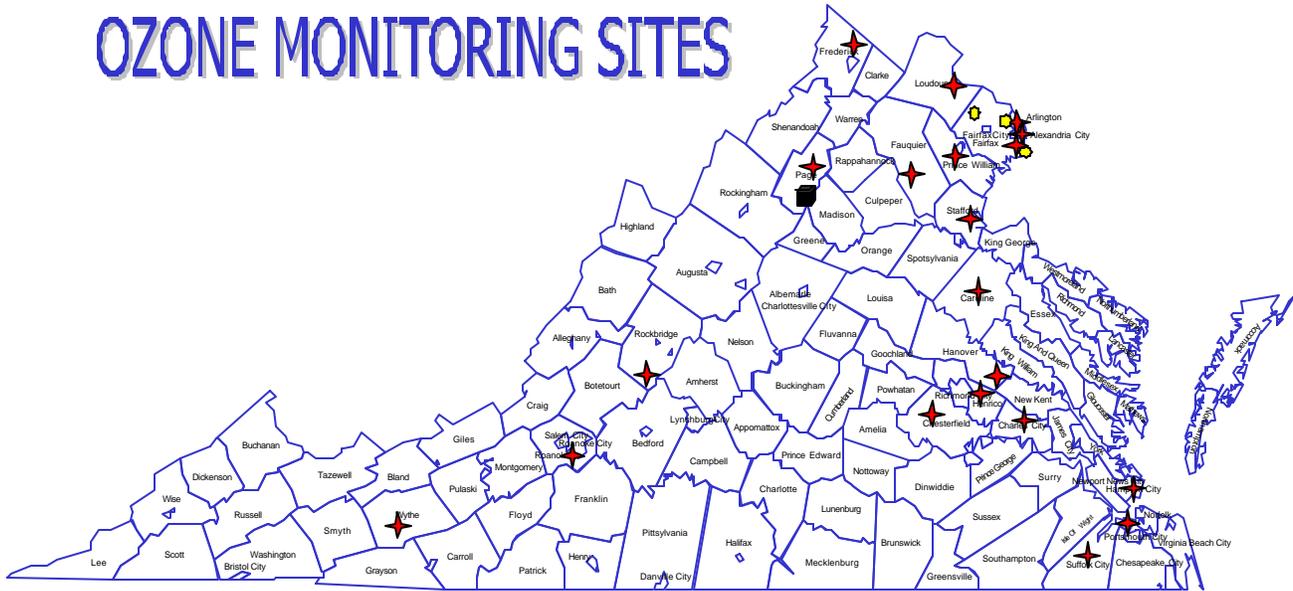
**NITROGEN DIOXIDE, ALEXANDRIA**  
**ANNUAL ARITHMETRIC MEAN**  
**L-126-C, 517 North Saint Asaph Street**



**NITROGEN DIOXIDE, FAIRFAX COUNTY**  
**ANNUAL ARITHMETIC MEAN**  
**L-46-A8, McLean Governmental Center, Fairfax County**



# OZONE MONITORING SITES



## Reporting Organizations

-  VA Department of Environmental Quality
-  Fairfax County Health Department
-  National Park Service

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**OZONE** ( $O_3$ ) is formed by a complex series of reactions among nitrogen oxides and certain organic compounds under the influence of solar ultraviolet radiation (sunlight). Ozone shows a very strong diurnal (daily) and seasonal (April to October) cyclical character. Ozone injures vegetation, has adverse effects on materials (rubber and fabrics) and is a pulmonary irritant that affects the respiratory mucous membranes, lung tissues and respiratory functions.

Ozone is measured continuously by ultraviolet absorption photometry. Air is drawn continuously through a sample cell where narrow band ultraviolet light (254nm wavelength) passes through it. The proportion of light absorbed by ozone molecules in the air is converted into an electrical signal and recorded.

The National Park Service operated one ozone monitor in Shenandoah National Park in 2001. The data from this site may be obtained from the National Park Service or on the web at <http://www2.nature.nps.gov/ard/gas/netdata1.htm>.

Hourly ozone values for monitoring sites in the state can be viewed for the months of April to October on the DEQ web page at <http://www.deq.state.va.us/ozone>. In addition, animated ozone maps for Virginia and other parts of the United States are available at <http://www.epa.gov/airnow>.

**VIRGINIA 2001  
 OZONE SUMMARY BY REGION  
 METHOD 19 - INSTRUMENTAL ULTRAVIOLET  
 Parts Per Million (ppm), Eastern Standard Time  
 Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 8-HR OBS.	FOUR HIGHEST DAILY MAXIMUM 8-HOUR AVERAGE VALUES								DAYS >.08	
		1ST MAX	DATE	2ND MAX	DATE	3RD MAX	DATE	4TH MAX	DATE		
<b>SOUTHWEST REGION</b>											
WYTHE CO. 16-B Rural Retreat Sewage Disposal	5044	.085	MAY 5	.083	MAY 3	.076	MAY 4	.076	JUN 19	1	
<b>VALLEY REGION</b>											
ROCKBRIDGE CO. 21-C Natural Bridge Ranger Station	4782	.087	MAY 3	.084	MAY 2	.083	MAY 5	.082	MAY 4	1	
FREDERICK CO. 28-J Rest	5002	.088	MAY 2	.088	MAY 3	.087	JUN 29	.086	MAY 4	5	
PAGE CO. 29-D Luray Caverns Airport	5111	.091	MAY 3	.090	MAY 2	.087	JUN 28	.086	MAY 1	6	
<b>WEST CENTRAL REGION</b>											
VINTON 19-A6 East Vinton Elementary Sch.	5081	.095	JUN 19	.092	MAY 4	.089	MAY 3	.089	JUN 20	5	
<b>PIEDMONT REGION</b>											
CHARLES CITY CO. 75-B Route 608	4951	.097	MAY 5	.095	AUG 8	.093	AUG 7	.089	JUN 26	6	
CHESTERFIELD CO. 71-H Beach Road	4943	.093	JUN 18	.091	MAY 5	.090	JUL 17	.086	JUN 26	6	

**VIRGINIA 2001  
OZONE SUMMARY BY REGION  
METHOD 19 AND 47 - INSTRUMENTAL ULTRAVIOLET  
Parts Per Million (ppm), Eastern Standard Time  
Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 8-HR OBS.	FOUR HIGHEST DAILY MAXIMUM 8-HOUR AVERAGE VALUES									DAYS >.08
		1ST MAX	DATE	2ND MAX	DATE	3RD MAX	DATE	4TH MAX	DATE		
<b>PIEDMONT REGION (cont.)</b>											
HENRICO CO. Math and Science Center	72-M	5021	.108	AUG 8	.093	JUN 19	.093	JUN 29	.091	MAY 5	10
HANOVER CO. McClellan Road	179-C	5117	.102	JUN 29	.097	JUN 19	.092	JUN 20	.091	MAY 5	8
<b>TIDEWATER REGION</b>											
HAMPTON Virginia School	179-C	5122	.098	JUN 29	.088	JUN 26	.086	JUL 10	.085	MAY 5	4
SUFFOLK Tidewater Comm. College	183-E	5129	.108	JUN 29	.088	JUN 9	.087	JUN 26	.085	MAY 11	4
SUFFOLK Tidewater Research Station	183-F	5085	.080	MAY 5	.077	JUN 12	.077	JUN 19	.075	JUN 18	0
<b>NORTHERN REGION</b>											
ARLINGTON CO. Aurora Hills Visitors Center	47-T	5109	.103	JUN 26	.102	JUN 13	.100	JUN 29	.098	JUN 27	12
CAROLINE CO. U.S.G.S. Geomagnetic Center	48-A	5059	.095	MAY 4	.089	MAY 2	.088	MAY 5	.086	MAY 3	4
FAIRFAX CO. Lee District Park	46-B9	4951	.106	JUN 29	.097	JUN 26	.096	JUN 18	.096	JUN 20	14
FAUQUIER CO. Phelps Wildlife Area	37-B	5121	.085	MAY 1	.084	MAY 4	.083	MAY 2	.082	MAY 3	1

**VIRGINIA 2001  
OZONE SUMMARY BY REGION  
METHOD 19 - INSTRUMENTAL ULTRAVIOLET  
Parts Per Million (ppm), Eastern Standard Time  
Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 8-HR OBS.	FOUR HIGHEST DAILY MAXIMUM 8-HOUR AVERAGE VALUES								DAYS >.08	
		1ST MAX	DATE	2ND MAX	DATE	3RD MAX	DATE	4TH MAX	DATE		
<b>NORTHERN REGION (CONT.)</b>											
LOUDOUN CO.            38-I Broad Run High School	5088	.104	JUN 13	.100	JUN 26	.094	JUN 21	.093	JUN 20	9	
PRINCE WILLIAM CO.    45-L Long Park	5133	.100	JUN 13	.093	MAY 4	.092	MAY 2	.089	MAY 3	6	
STAFFORD CO.            44-A Widewater Elementary School	5127	.090	JUN 29	.088	MAY 5	.087	JUN 18	.086	MAY 2	6	
ALEXANDRIA            L-126-C 517 North Saint Asaph Street	5064	.097	AUG 9	.095	JUN 29	.094	JUN 13	.091	JUN 26	6	
<b>FAIRFAX CO.</b>											
FAIRFAX CO.            L-46-A8* 1437 Balls Hill Road	8716	.103	JUN 20	.101	JUN 26	.093	JUN 13	.090	JUN 21	8	
FAIRFAX CO.            L-46-B3 2675 Sherwood Hall Lane	5043	.101	JUN 29	.100	JUN 18	.096	JUN 20	.095	AUG 9	10	
FAIRFAX CO.            L-46-F* Upper Cub Run Sewage Treatment Plant	8607	.099	JUN 13	.098	JUN 20	.094	MAY 4	.093	MAY 2	9	

\*These stations run year round.

**1994-2001  
VIRGINIA 'S 4th HIGHEST OZONE 8-HOUR AVERAGES  
Parts Per Million (ppm)**

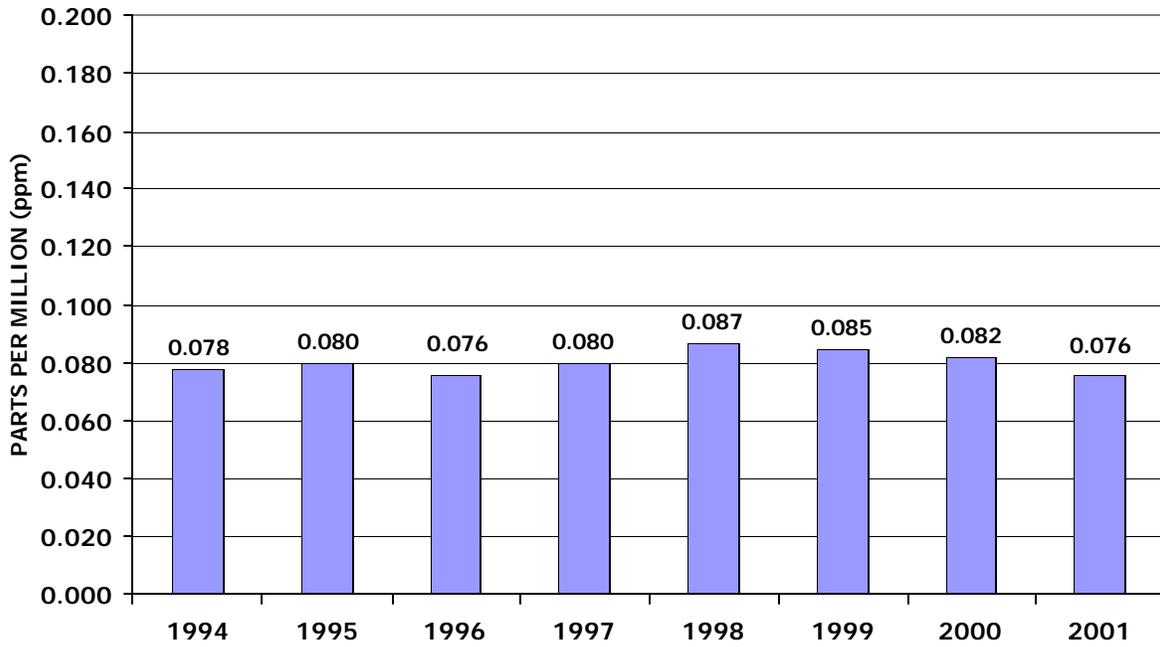
LOCATION	STATION NUMBER	1994	1995	1996	1997	1998	1999	2000	2001
<b>WYTHE CO.</b> , Rural Retreat	16-B	.078	.080	.076	.080	.087	.085	.082	.076
<b>ROCKBRIDGE CO.</b> , Natural Bridge Ranger Station	21-C	--	--	--	--	--	.081	.077	.082
<b>REST</b> , Lester Building Systems	28-J	.083	.085	.080	.088	.098	.085	.079	.086
<b>PAGE CO.</b> , Luray Caverns Airport	29-D	--	--	--	--	--	.086	.076	.086
<b>VINTON</b> , East Vinton Elementary School	19-A6	.084	.079	.073	.084	.099	.089	.081	.089
<b>CHESTERFIELD CO.</b> , Beach Road	71-H	.083	.090	.083	.090	.090	.093	.080	.086
<b>HENRICO CO.</b> , Math & Science Center	72-M	.085	.089	.084	.098	.096	.096	.083	.091
<b>HANOVER CO.</b> , McClellan Road	73-E	--	--	--	--	--	--	--	.091
<b>CHARLES CITY CO.</b> , Route 608	75-B	.082	.088	.084	.100	.092	.097	.076	.089
<b>HAMPTON</b> , Virginia School	179-C	.085	.082	.083	.097	.090	.097	.081	.085
<b>SUFFOLK</b> , Tidewater Community College	183-E	.078	.082	.075	.091	.087	.094	.081	.085
<b>SUFFOLK</b> , Tidewater Research Station	183-F	.081	.086	.074	.088	.087	.091	.084	.075
<b>FAUQUIER CO.</b> , Phelps Wildlife Area	37-B	.078	.082	.078	.083	.093	.088	.077	.082
<b>LOUDOUN CO.</b> , Broad Run High School	38-I	--	--	--	--	.102	.090	.077	.093
<b>STAFFORD CO.</b> , Widewater Elementary School	44-A	.084	.088	.081	.091	.092	.092	.079	.086
<b>PRINCE WILLIAM CO.</b> , Long Park	45-L	.082	.097	.082	.086	.098	.089	.079	.089
<b>FAIRFAX CO.</b> , Lee District Park	46-B9	--	--	--	--	.097	.099	.070	.096

**1994-2001  
VIRGINIA 'S 4th HIGHEST OZONE 8-HOUR AVERAGES  
Parts Per Million (ppm)**

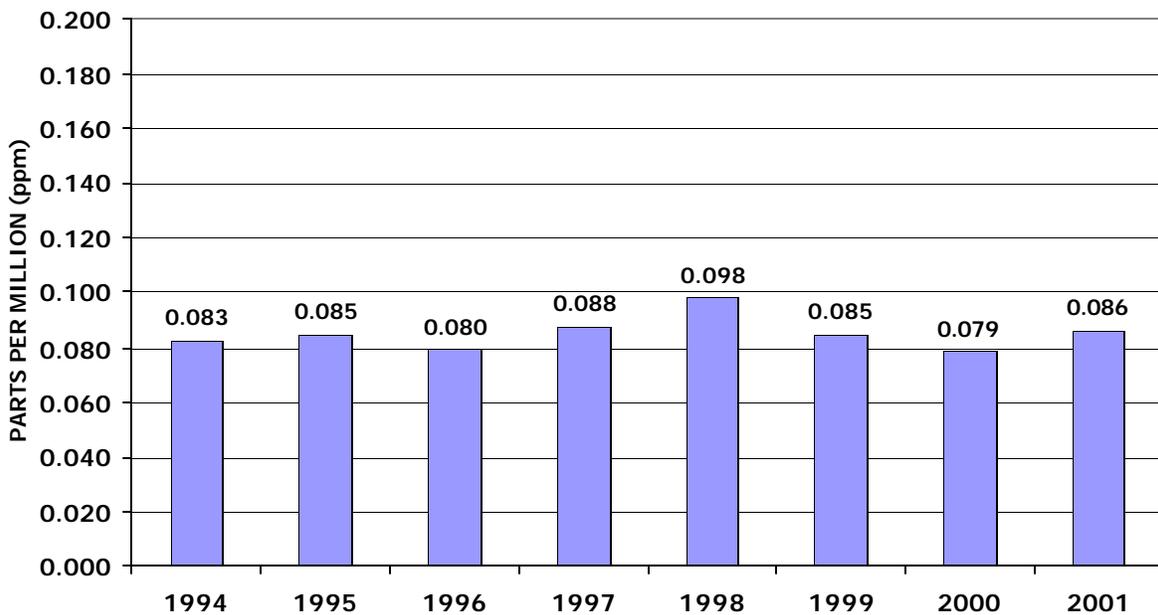
LOCATION	STATION NUMBER	1994	1995	1996	1997	1998	1999	2000	2001
<b>ARLINGTON CO.</b> , Aurora Hills Visitors Center	47-T	.089	.097	.084	.094	.098	.100	.080	.098
<b>CAROLINE CO.</b> , Corbin	48-A	.082	.082	.080	.091	.095	.091	.078	.086
<b>ALEXANDRIA</b> , 517 N. St. Asaph Street	L-126-C	.088	.090	.070*	.085	.094	.096	.077	.091
<b>FAIRFAX CO.</b> , 1437 Balls Hill Road, McLean	L-46-A8	.085	.097	.077	.080	.090	.087	.082	.090
<b>FAIRFAX CO.</b> , 2675 Sherwood Hall Ln, Mt. Vernon	L-46-B3	.092	.099	.089	.088	.101	.100	.092	.095
<b>FAIRFAX CO.</b> , Upper Cub Run, Chantilly	L-46-F	.086	.093	.079	.079	.103	.092	.079	.093

\*Data capture for the year was less than 75% due to instrument malfunction

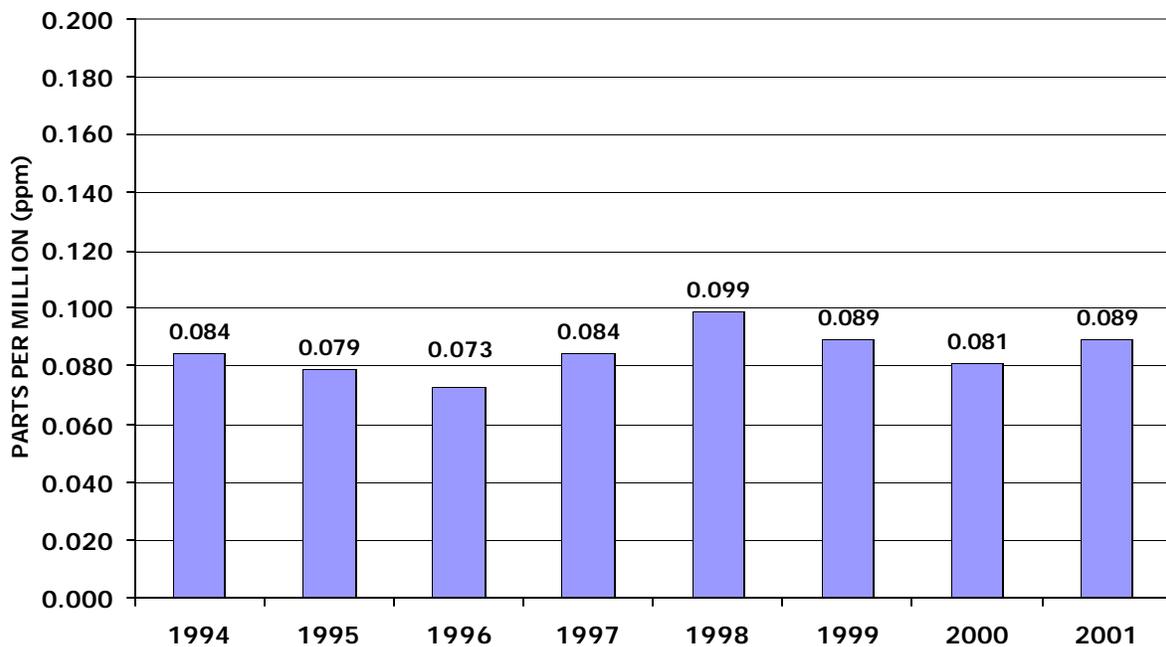
**OZONE, SOUTHWEST REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**16-B, Rural Retreat, Wythe County**



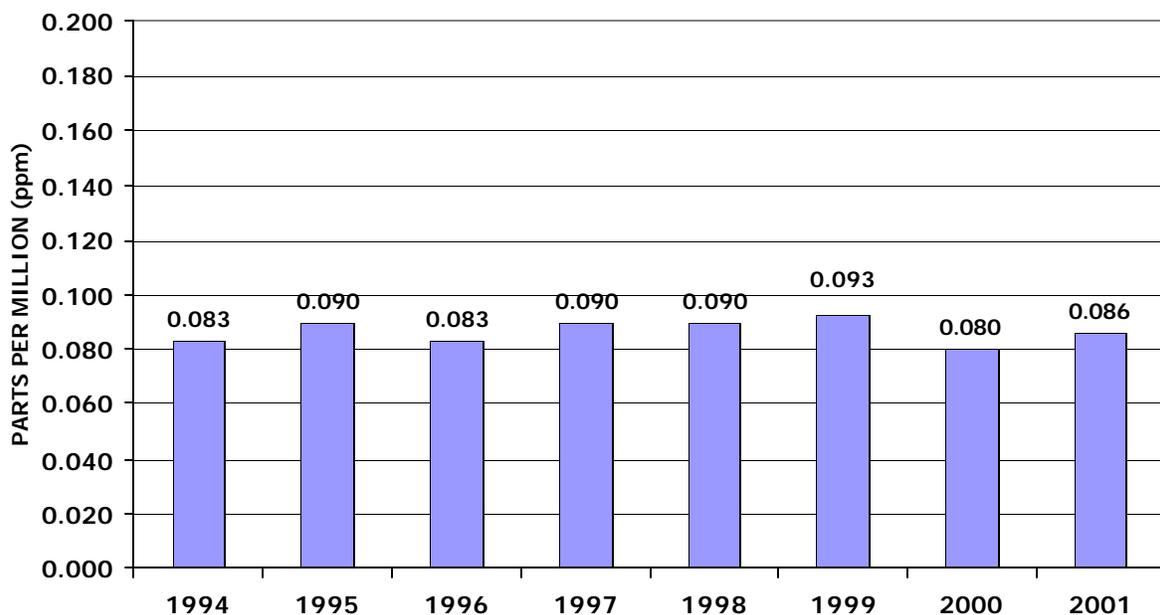
**OZONE, VALLEY REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**28-J, Rest, Frederick County**



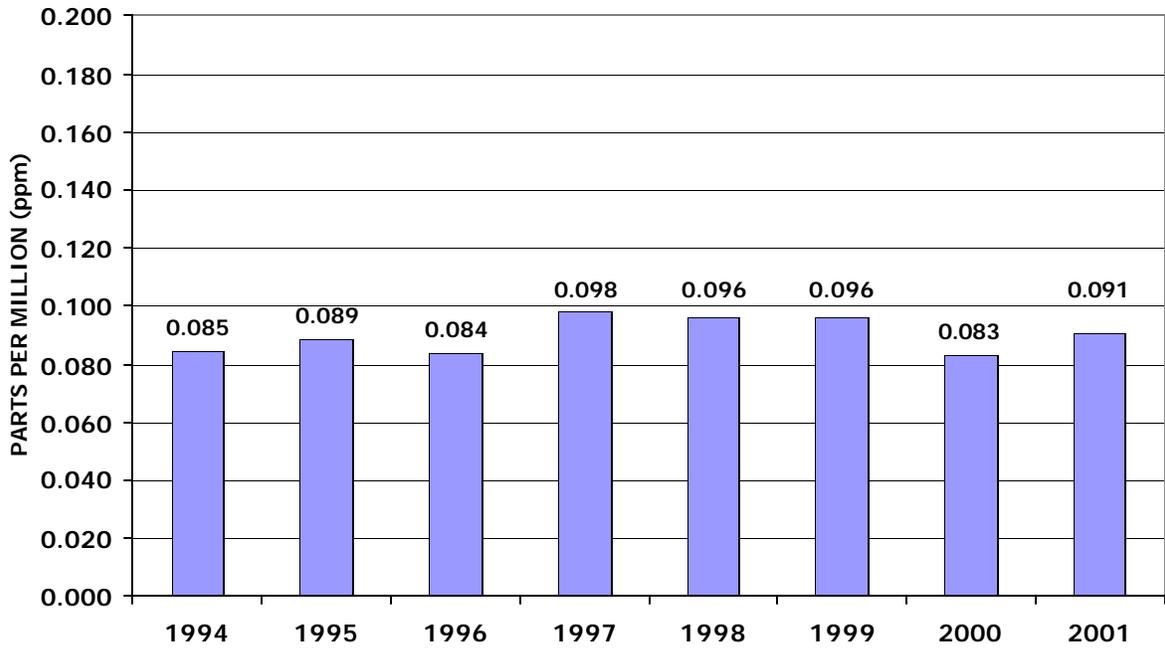
**OZONE, WEST CENTRAL REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**19-A6, Vinton Elementary School, Vinton**



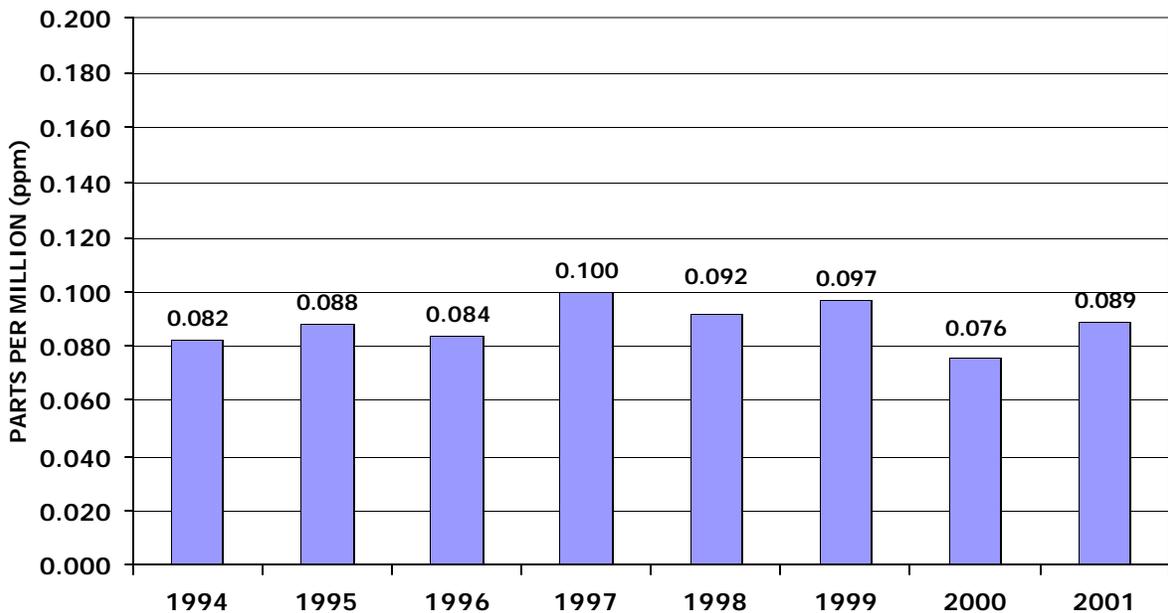
**OZONE, PIEDMONT REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**71-H, Beach Road, Chesterfield County**



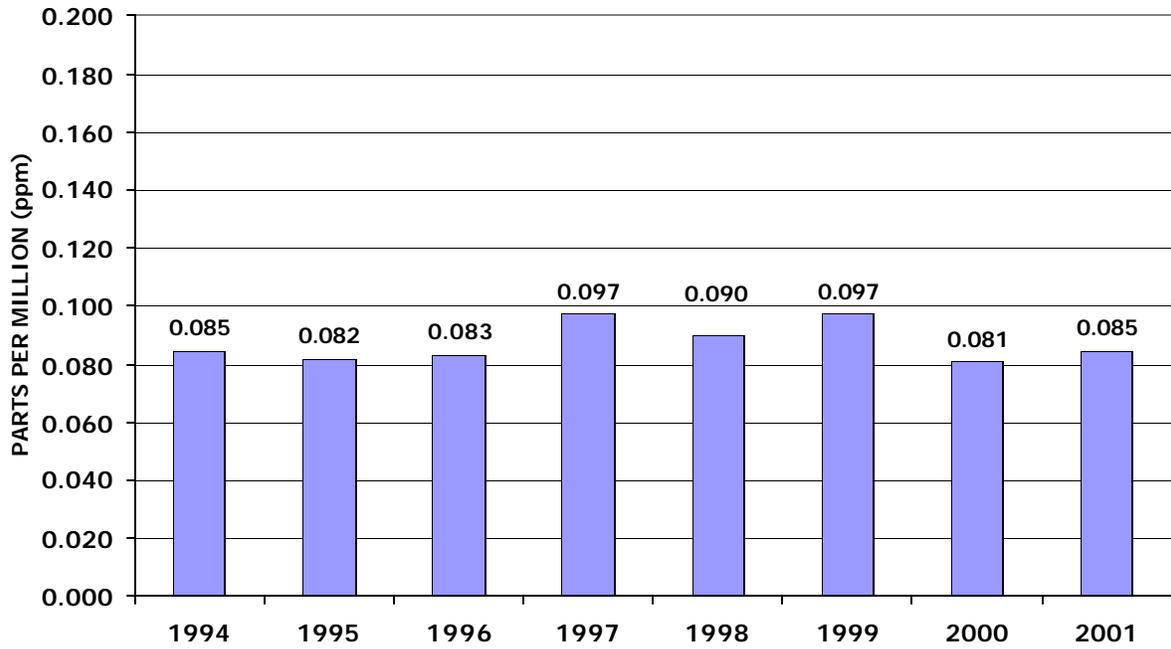
**OZONE, PIEDMONT REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**72-M, Math & Science Center, Henrico County**



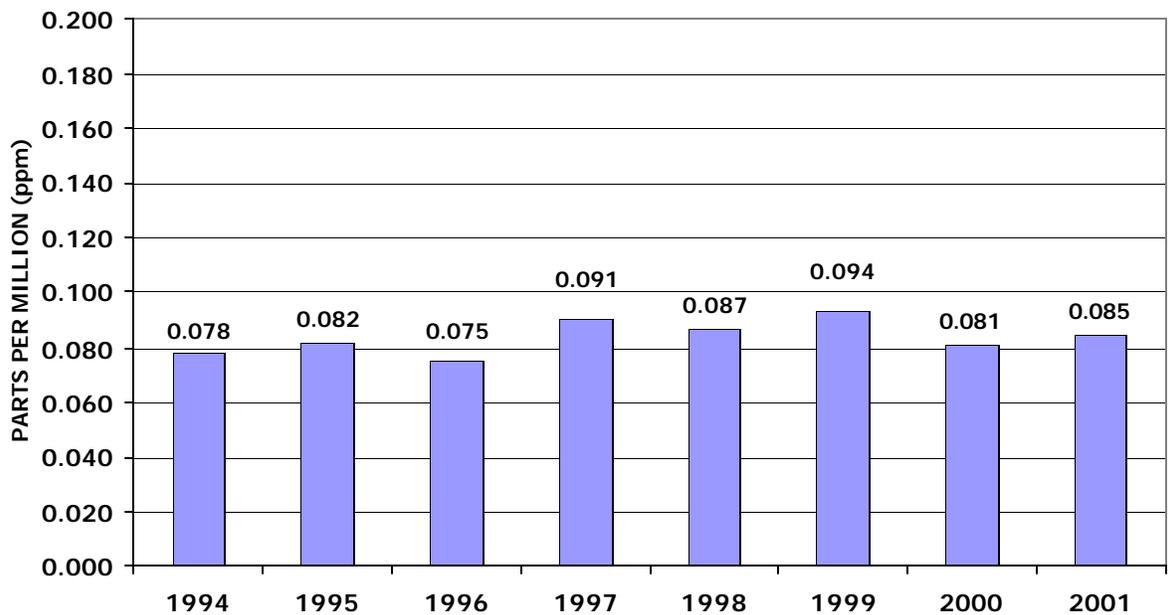
**OZONE, PIEDMONT REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**75-B, Route 608, Charles City County**



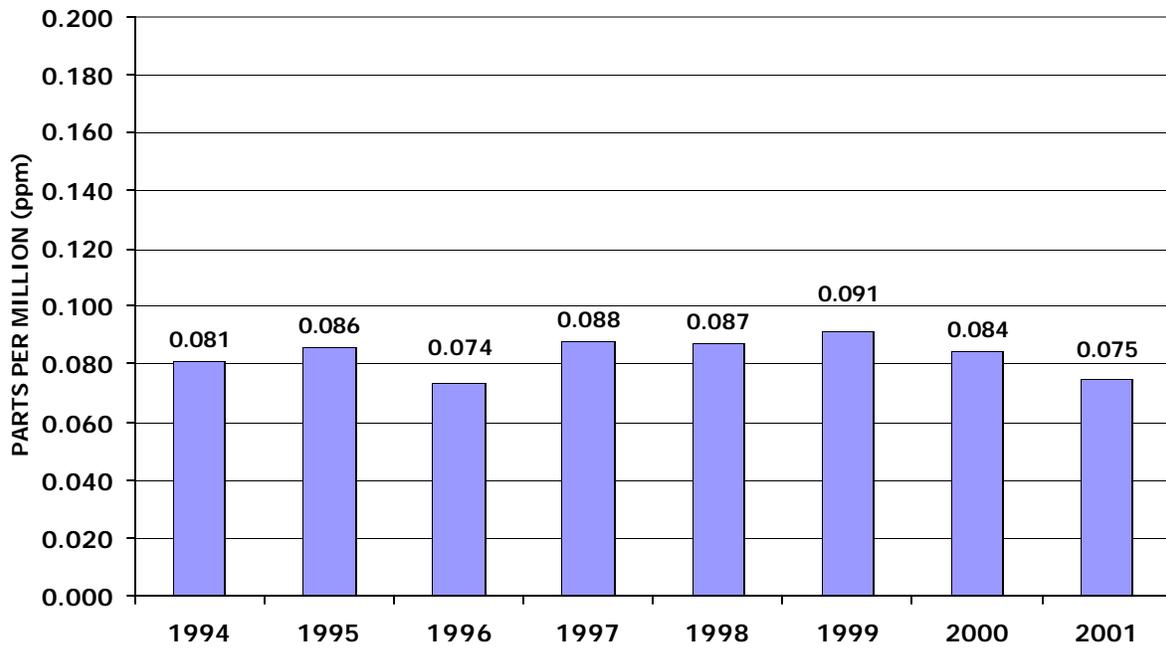
**OZONE, TIDEWATER REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**179-C, Virginia School, Hampton**



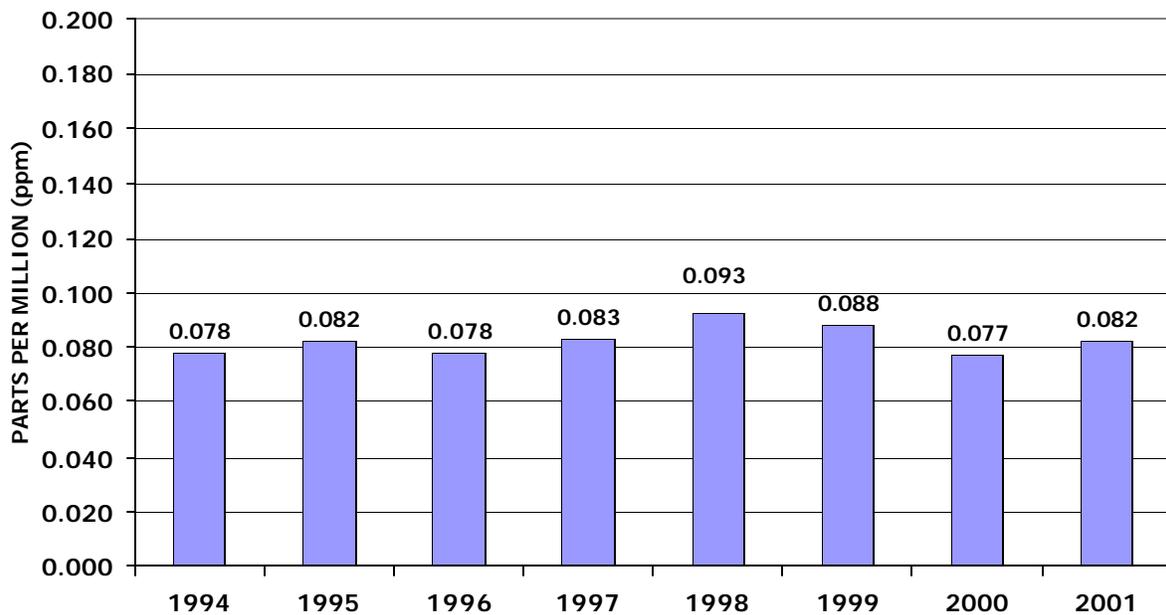
**OZONE, TIDEWATER REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**183-E, Tidewater Community College, Suffolk**



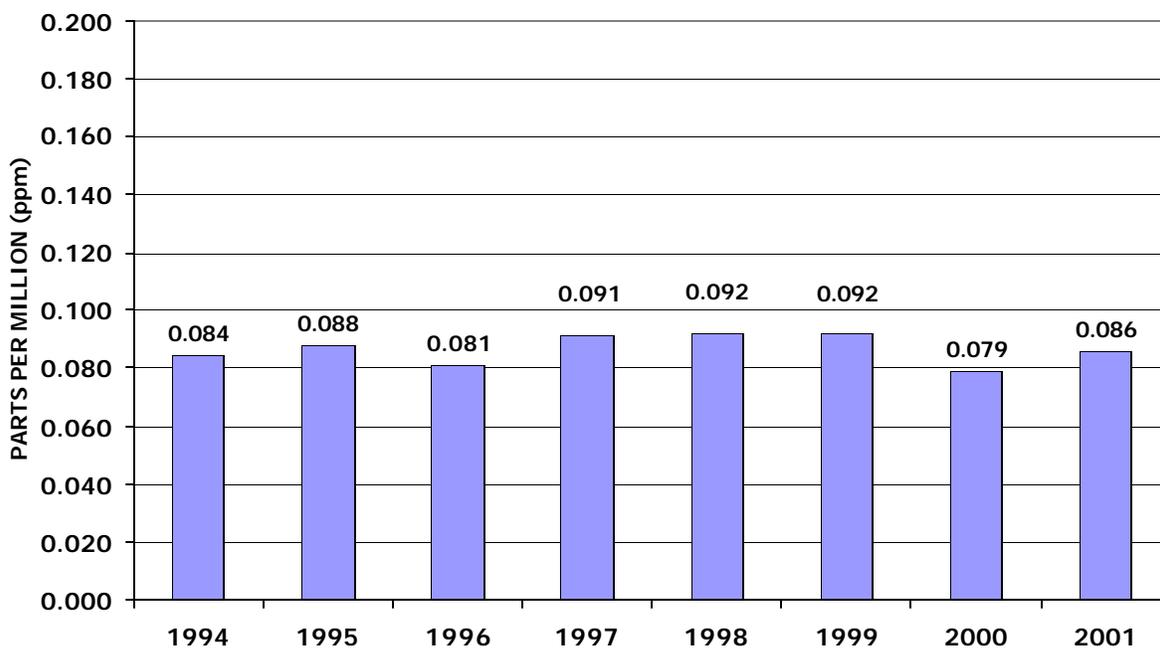
**OZONE, TIDEWATER REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**183-F, Holland, Suffolk**



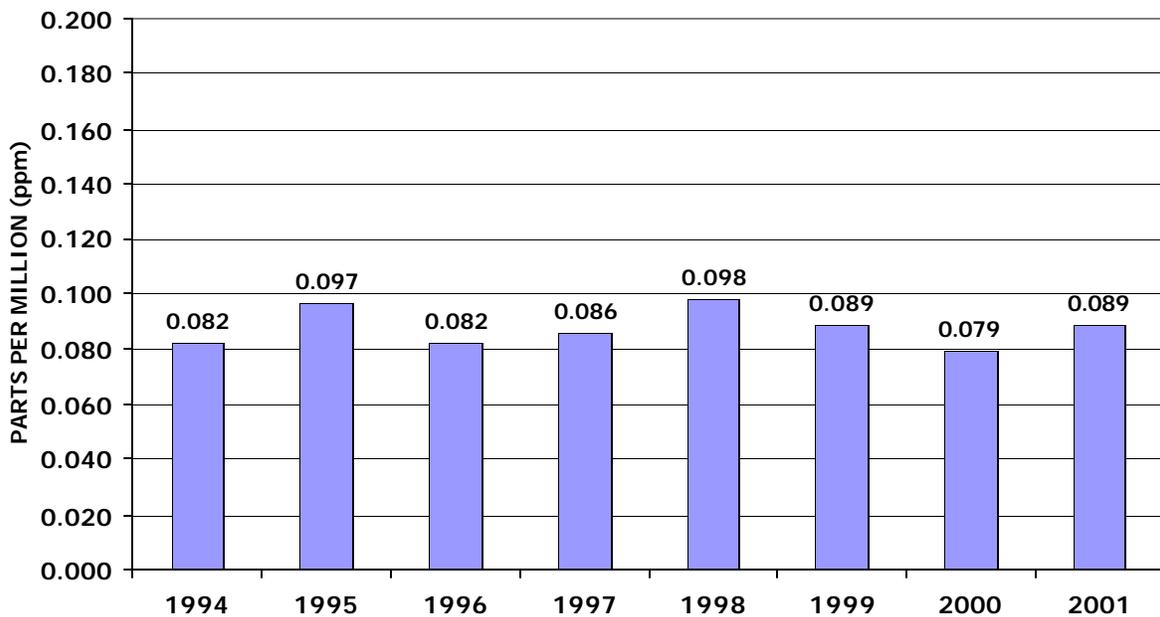
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**37-B, Phelps Wildlife Area, Fauquier County**



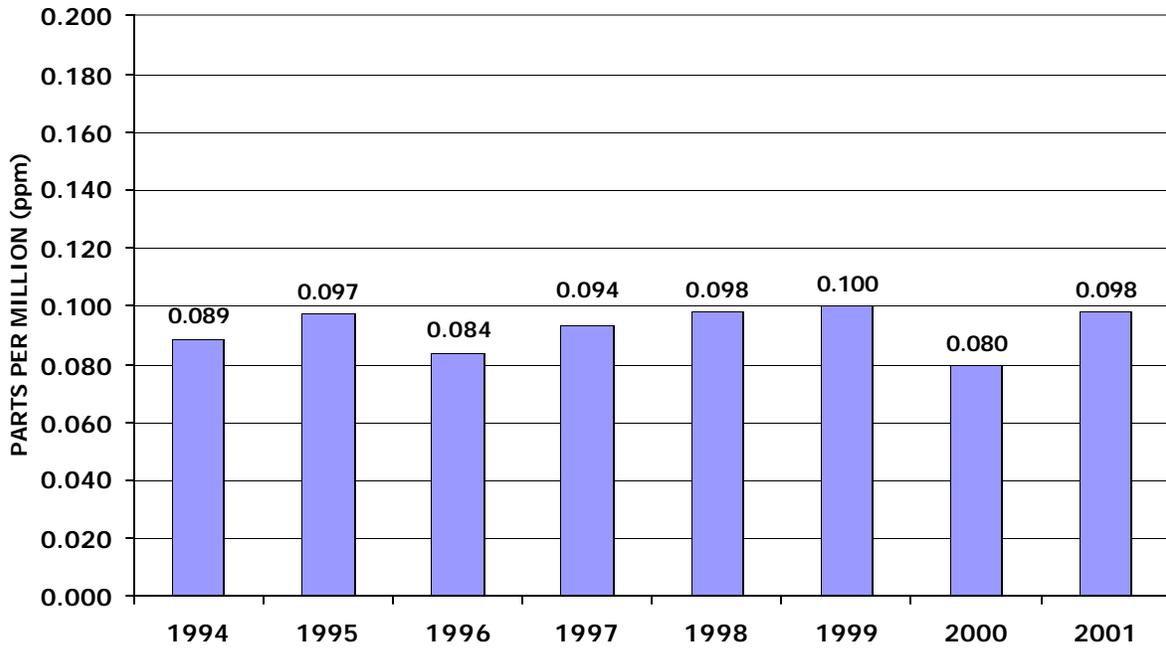
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
44-A, Widewater Elementary School, Stafford County



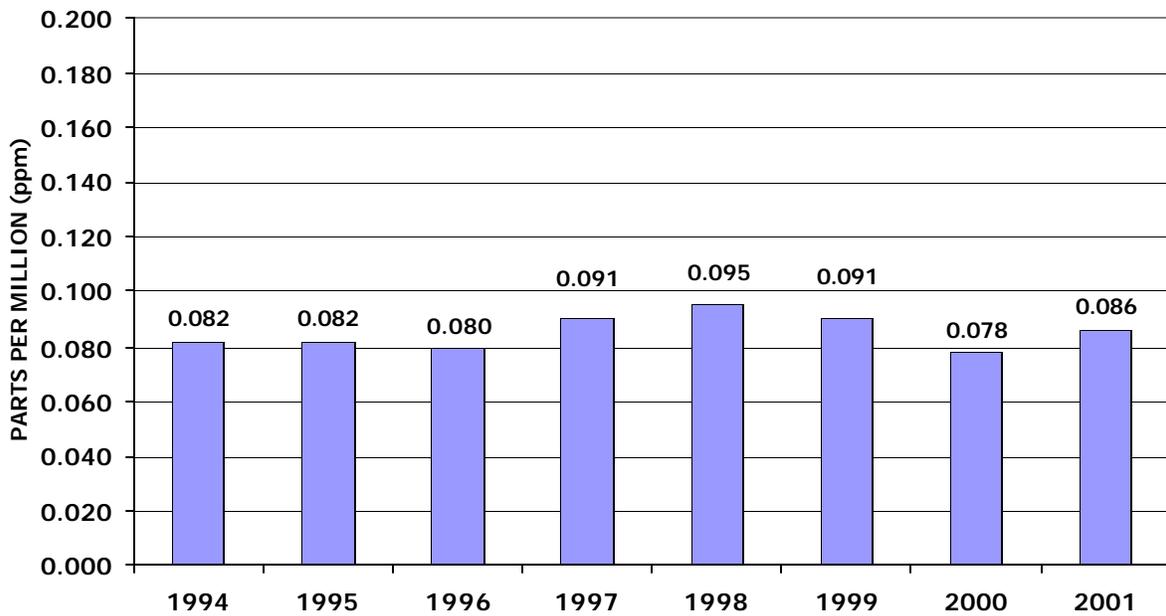
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
45-L, Long Park, Prince William County



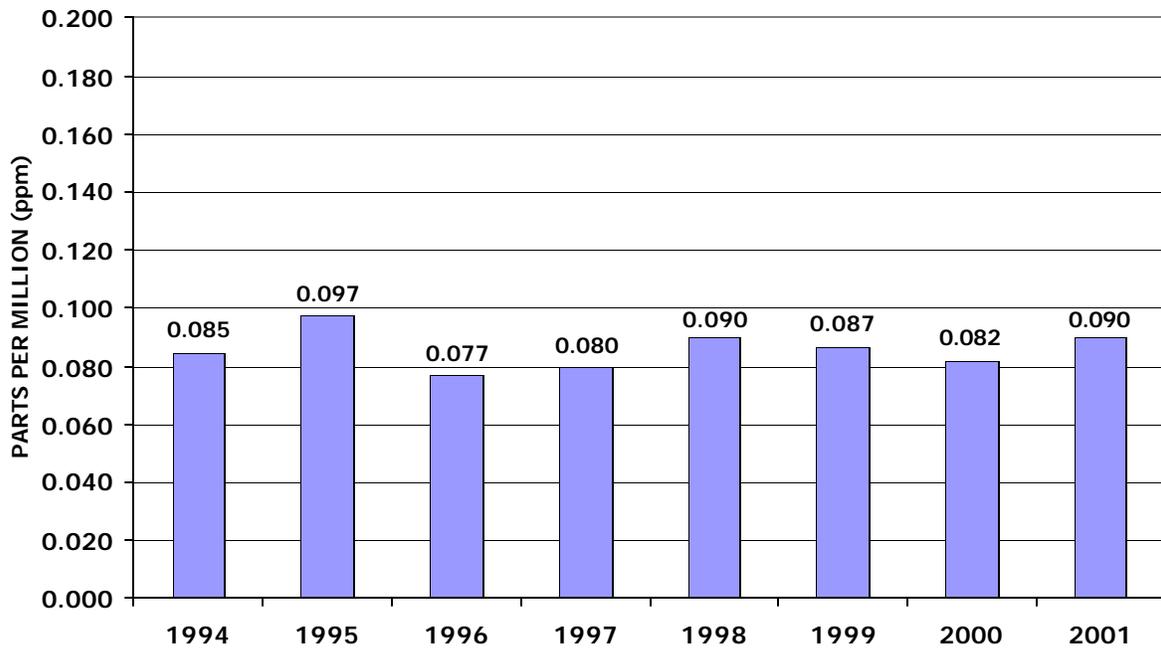
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**47-T, Aurora Hills Visitors Center, Arlington County**



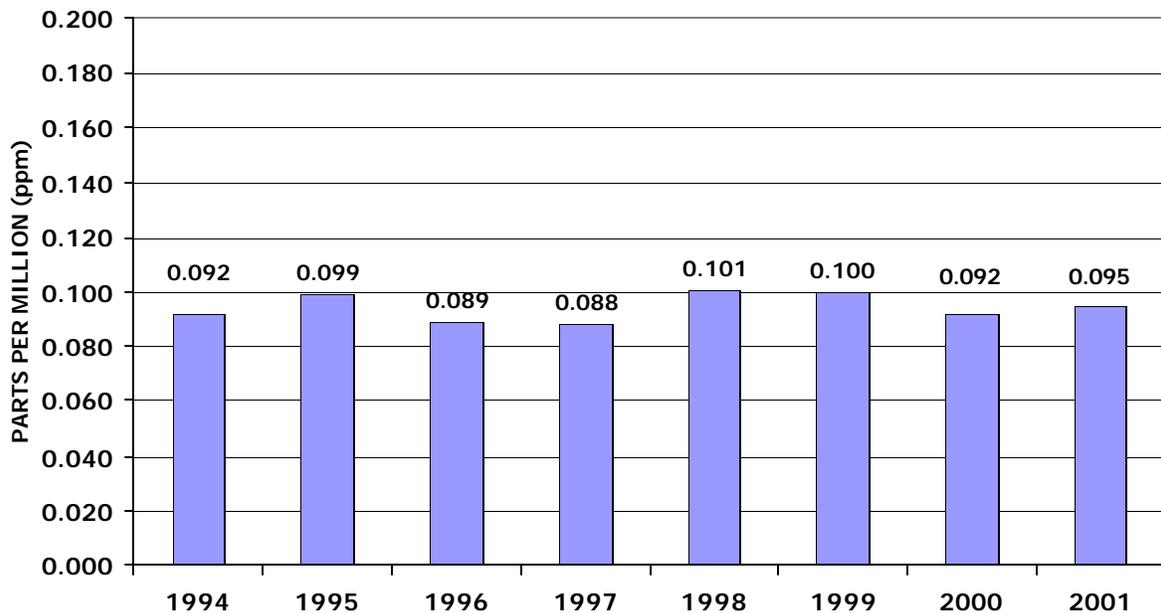
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**48-A, U.S.G.S. Geomagnetic Center, Corbin**



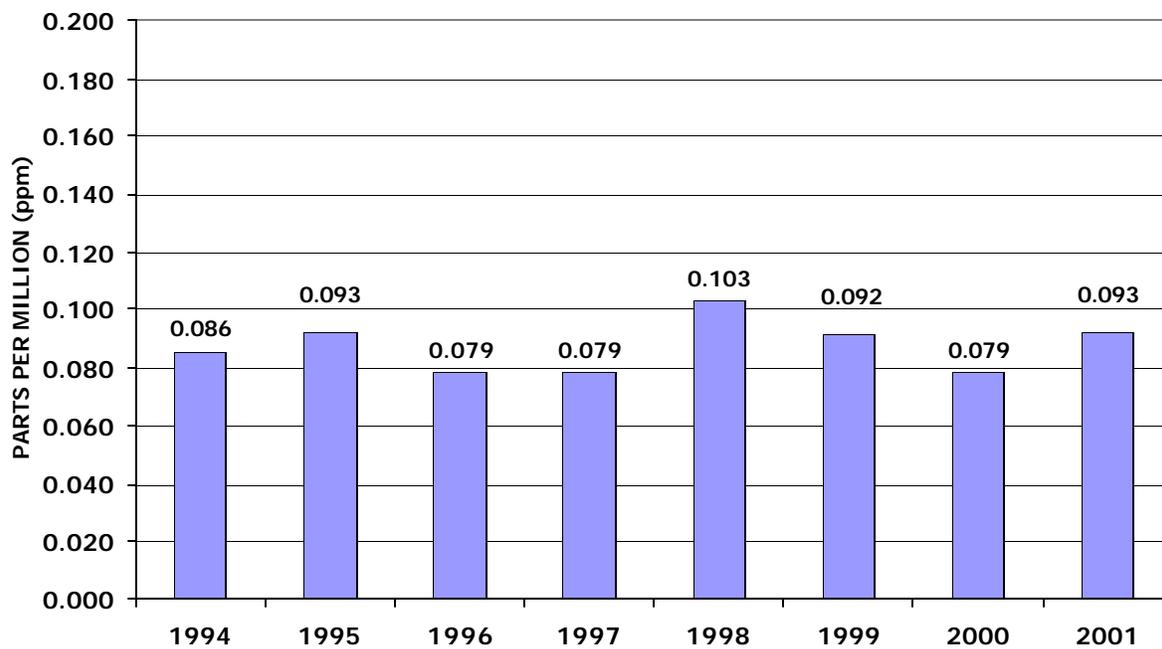
**OZONE, FAIRFAX COUNTY**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**L-46-A8, 1437 Balls Hill Road, McLean**



**OZONE, FAIRFAX COUNTY**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**L-46-B3, 2675 Sherwood Hall Lane, Mt. Vernon**



**OZONE, FAIRFAX COUNTY**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**L-46-F, Upper Cub Run Drive, Chantilly**



**VIRGINIA 2001  
 OZONE SUMMARY BY REGION  
 METHOD 19 - INSTRUMENTAL ULTRAVIOLET  
 Parts Per Million (ppm)  
 Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 1-HR OBS.	FOUR HIGHEST DAILY MAXIMUM HOURLY VALUES								DAYS >.12	
		1ST MAX	DATE TIME	2ND MAX	DATE TIME	3RD MAX	DATE TIME	4TH MAX	DATE TIME		
<b>SOUTHWEST REGION</b>											
WYTHE CO. 16-B Rural Retreat Sewage Disposal	4991	.091	MAY 5 2:00 PM	.085	MAY 3 1:00 PM	.083	MAY 4 NOON	.080	JUN 20 NOON	0	
<b>VALLEY REGION</b>											
ROCKBRIDGE CO. 21-C Natural Bridge	4748	.093	MAY 4 1:00 PM	.091	MAY 3 2:00 PM	.089	MAY 2 2:00 PM	.087	MAY 5 NOON	0	
FREDERICK CO. 28-J Rest	4951	.106	JUN 29 1:00 PM	.097	MAY 2 2:00 PM	.097	MAY 4 4:00 PM	.096	JUN 20 2:00 PM	0	
PAGE CO. 29-D Luray Caverns Airport	5047	.096	MAY 2 2:00 PM	.096	MAY 3 NOON	.095	JUN 20 NOON	.094	MAY 4 11:00 AM	0	
<b>WEST CENTRAL REGION</b>											
VINTON 19-A6 East Vinton Elementary Sch.	5036	.110	JUN 19 1:00 PM	.101	MAY 4 1:00 PM	.099	AUG 9 NOON	.098	JUN 20 11:00 AM	0	
<b>PIEDMONT REGION</b>											
CHARLES CITY CO. 75-B Route 608	4910	.121	AUG 7 1:00 PM	.119	AUG 8 2:00 PM	.117	MAY 5 2:00 PM	.114	JUN 29 NOON	0	

**VIRGINIA 2001  
 OZONE SUMMARY BY REGION  
 METHOD 19 AND 47 - INSTRUMENTAL ULTRAVIOLET  
 Parts Per Million (ppm)  
 Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 1-HR OBS.	FOUR HIGHEST DAILY MAXIMUM HOURLY VALUES									DAYS >.12
		1ST MAX	DATE TIME	2ND MAX	DATE TIME	3RD MAX	DATE TIME	4TH MAX	DATE TIME		
<b>PIEDMONT REGION (cont.)</b>											
CHESTERFIELD CO. 71-H Beach Road	4894	.115	AUG 8 NOON	.107	JUN 18 4:00 PM	.100	MAY 5 2:00 PM	.100	JUN 13 1:00 PM	0	
HENRICO CO. 72-M Math & Science Center	4979	.136	AUG 8 4:00 PM	.113	JUN 21 2:00 PM	.110	JUN 29 11:00 AM	.102	JUN 19 4:00 PM	1	
HANOVER CO. 73-E McClellan Road	5055	.122	JUN 29 2:00 PM	.119	JUN 12 2:00 PM	.112	JUN 19 4:00 PM	.109	AUG 9 11:00 AM	0	
<b>TIDEWATER REGION</b>											
HAMPTON 179-C Virginia School	5052	.110	JUN 29 1:00 PM	.100	MAY 5 4:00 PM	.095	JUN 26 5:00 PM	.094	AUG 8 11:00 AM	0	
SUFFOLK 183-E Tidewater Comm. College	5064	.132	JUN 29 11:00 AM	.100	JUN 26 3:00 PM	.098	JUN 9 NOON	.095	JUL 10 1:00 PM	1	
SUFFOLK 183-F Tidewater Research Station	5034	.085	MAY 5 3:00 PM	.084	JUN 19 5:00 PM	.084	JUN 29 11:00 AM	.084	AUG 9 NOON	0	
<b>NORTHERN REGION</b>											
ARLINGTON CO. 47-T Aurora Hills Visitors Center	5051	.124	JUN 13 1:00 PM	.121	JUN 29 1:00 PM	.117	JUN 26 4:00 PM	.112	JUN 18 5:00 PM	0	
CAROLINE CO. 48-A U.S.G.S. Geomagnetic Center	5001	.104	MAY 5 3:00 PM	.100	MAY 4 4:00 PM	.095	MAY 2 2:00 PM	.095	JUN 20 2:00 PM	0	

**VIRGINIA 2001  
 OZONE SUMMARY BY REGION  
 METHOD 19 - INSTRUMENTAL ULTRAVIOLET  
 Parts Per Million (ppm)  
 Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 1-HR OBS.	FOUR HIGHEST DAILY MAXIMUM HOURLY VALUES									DAYS >.12
		1ST MAX	DATE TIME	2ND MAX	DATE TIME	3RD MAX	DATE TIME	4TH MAX	DATE TIME		
<b>NORTHERN REGION (cont.)</b>											
FAUQUIER CO. 37-B Phelps Wildlife Area	5055	.114	JUN 13 4:00 PM	.094	MAY 1 5:00 PM	.094	MAY 4 4:00 PM	.091	MAY 5 NOON	0	
LOUDOUN CO. 38-I Broad Run High School	5035	.117	JUN 13 4:00 PM	.111	JUN 26 2:00 PM	.106	JUN 21 5:00 PM	.103	MAY 3 4:00 PM	0	
PRINCE WILLIAM CO. 45-L Long Park	5080	.116	JUN 13 3:00 PM	.101	MAY 4 2:00 PM	.098	MAY 2 2:00 PM	.098	JUN 20 1:00 PM	0	
FRANCONIA 46-B9 Lee District Park	4900	.119	JUN 29 2:00 PM	.117	JUN 13 1:00 PM	.108	AUG 9 1:00 PM	.107	JUN 26 3:00 PM	0	
STAFFORD CO. 44-A Widewater Elementary School	5065	.108	JUN 29 NOON	.106	MAY 5 2:00 PM	.096	JUN 13 NOON	.096	JUN 18 3:00 PM	0	
<b>ALEXANDRIA</b>											
ALEXANDRIA L-126-C 517 North Saint Asaph St.	5049	.118	JUN 26 3:00 PM	.117	JUN 13 1:00 PM	.114	JUN 29 2:00 PM	.108	JUN 18 4:00 PM	0	
<b>FAIRFAX CO.</b>											
FAIRFAX CO. L-46-A8* 1437 Balls Hill Road	8715	.127	JUN 20 2:00 PM	.121	JUN 13 2:00 PM	.115	JUN 26 3:00 PM	.115	JUN 29 1:00 PM	1	
FAIRFAX CO. L-46-B3 2675 Sherwood Hall Lane	5032	.121	JUN 29 2:00 PM	.115	JUN 26 3:00 PM	.114	JUN 18 4:00 PM	.110	AUG 9 NOON	0	
FAIRFAX CO. L-46-F* Upper Cub Run Sewage Treatment Plant	8588	.117	JUN 13 2:00 PM	.109	JUN 20 2:00 PM	.108	JUN 21 3:00 PM	.105	MAY 4 2:00 PM	0	

\* These stations are run year round.

**VIRGINIA 2001  
OZONE SUMMARY BY REGION  
METHOD 19 - INSTRUMENTAL ULTRAVIOLET  
Parts Per Million (ppm)  
Ozone Season - April through October**

LOCATION/ STATION NO.	NO. DAILY OBS.	NUMBER OF DAILY MAXIMUM 1-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
<b>SOUTHWEST REGION</b>										
WYTHE CO. 16-B Rural Retreat Sewage Disposal	210	40	168	2	0	0	0	0	0	0
<b>WEST CENTRAL REGION</b>										
VINTON 19-A6 East Vinton Elementary School	211	34	162	15	0	0	0	0	0	0
<b>VALLEY REGION</b>										
ROCKBRIDGE CO. 21-C Natural Bridge	200	45	150	5	0	0	0	0	0	0
FREDERICK CO. 28-J Rest	206	45	149	12	0	0	0	0	0	0
PAGE CO. 29-D Luray Caverns Airport	211	33	171	7	0	0	0	0	0	0
<b>PIEDMONT REGION</b>										
CHARLES CITY CO. 75-B Route 608	207	42	149	16	0	0	0	0	0	0
CHESTERFIELD CO. 71-H Beach Road	206	55	138	13	0	0	0	0	0	0
HENRICO CO. 72-M Math and Science Center	210	50	139	20	1	0	0	0	0	0

**VIRGINIA 2001  
 OZONE SUMMARY BY REGION  
 METHOD 19 AND 47 - INSTRUMENTAL ULTRAVIOLET  
 Parts Per Million (ppm)  
 Ozone Season - April through October**

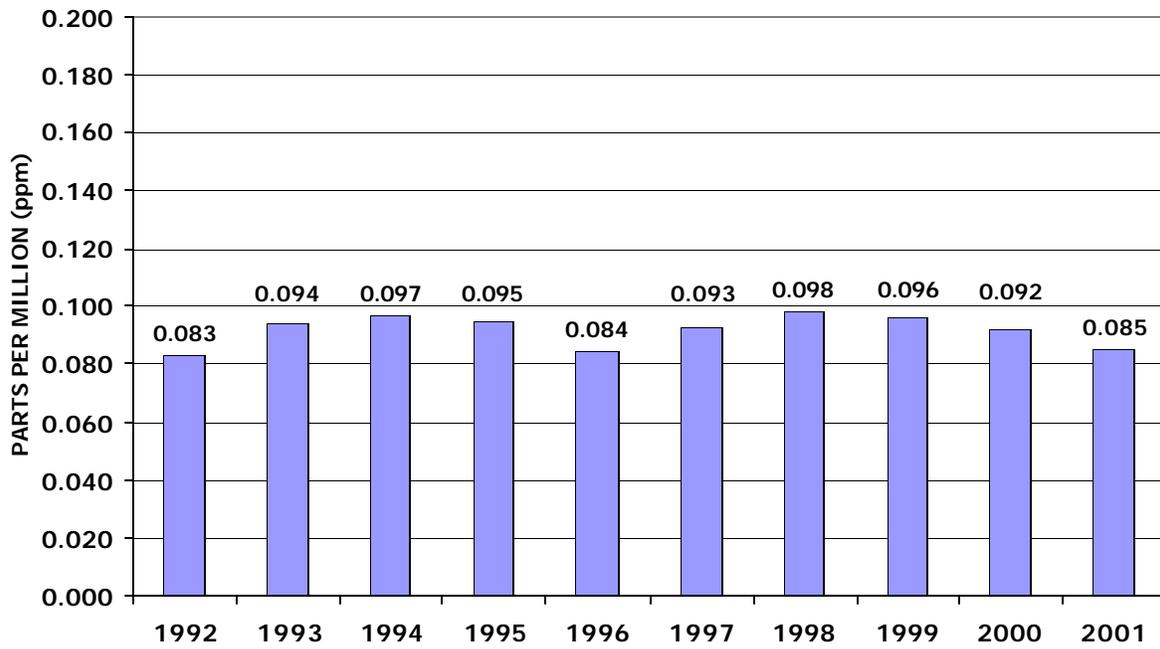
LOCATION/ STATION NO.	NO. DAILY OBS.	NUMBER OF DAILY MAXIMUM 1-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
		<b>PIEDMONT REGION (cont.)</b>								
HANOVER CO. 73-E McClellan Road	214	45	145	24	0	0	0	0	0	
<b>TIDEWATER REGION</b>										
HAMPTON 179-C Virginia School	213	59	144	10	0	0	0	0	0	
SUFFOLK 183-E Tidewater Comm. College	214	54	146	13	1	0	0	0	0	
SUFFOLK 183-F Tidewater Research Station	211	61	149	1	0	0	0	0	0	
<b>NORTHERN REGION</b>										
ARLINGTON CO. 47-T Aurora Hills Fire Station	212	50	133	29	0	0	0	0	0	
CAROLINE CO. 48-A U.S.G.S. Geomagnetic Center	211	41	153	17	0	0	0	0	0	
FAUQUIER CO. 37-B Phelps Wildlife Area	214	60	147	7	0	0	0	0	0	
FAIRFAX CO. 46-B9 Lee District Park	207	39	141	27	0	0	0	0	0	

**VIRGINIA 2001  
 OZONE SUMMARY BY REGION  
 METHOD 19 - INSTRUMENTAL ULTRAVIOLET  
 Parts Per Million (ppm)  
 Ozone Season - April through October**

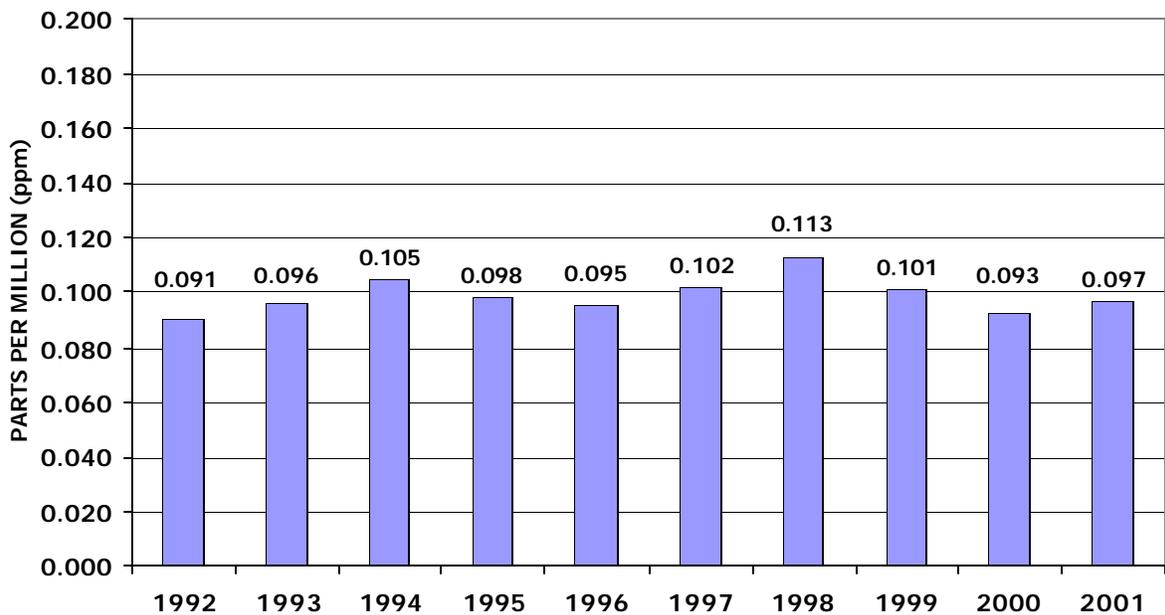
LOCATION/ STATION NO.	NO. DAILY OBS.	NUMBER OF DAILY MAXIMUM 1-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
<b>NORTHERN REGION (CONTINUED)</b>										
LOUDOUN CO. 38-I Broad Run High School	212	43	150	19	0	0	0	0	0	
PRINCE WILLIAM CO. 45-L Long Park	214	50	149	15	0	0	0	0	0	
STAFFORD CO. 44-A Widewater Elementary School	214	36	157	21	0	0	0	0	0	
ALEXANDRIA L-126-C 517 North Saint Asaph Street	211	67	124	20	0	0	0	0	0	
<b>FAIRFAX CO. HEALTH DEPT.</b>										
FAIRFAX CO. L-46-A8* 1437 Balls Hill Road	363	190	144	28	1	0	0	0	0	
FAIRFAX CO. L-46-B3 2675 Sherwood Hall Lane	211	47	135	29	0	0	0	0	0	
FAIRFAX CO. L-46-F* Upper Cub Run Sewage Treatment Plant	359	168	172	19	0	0	0	0	0	

\* These sites are operated year-round.

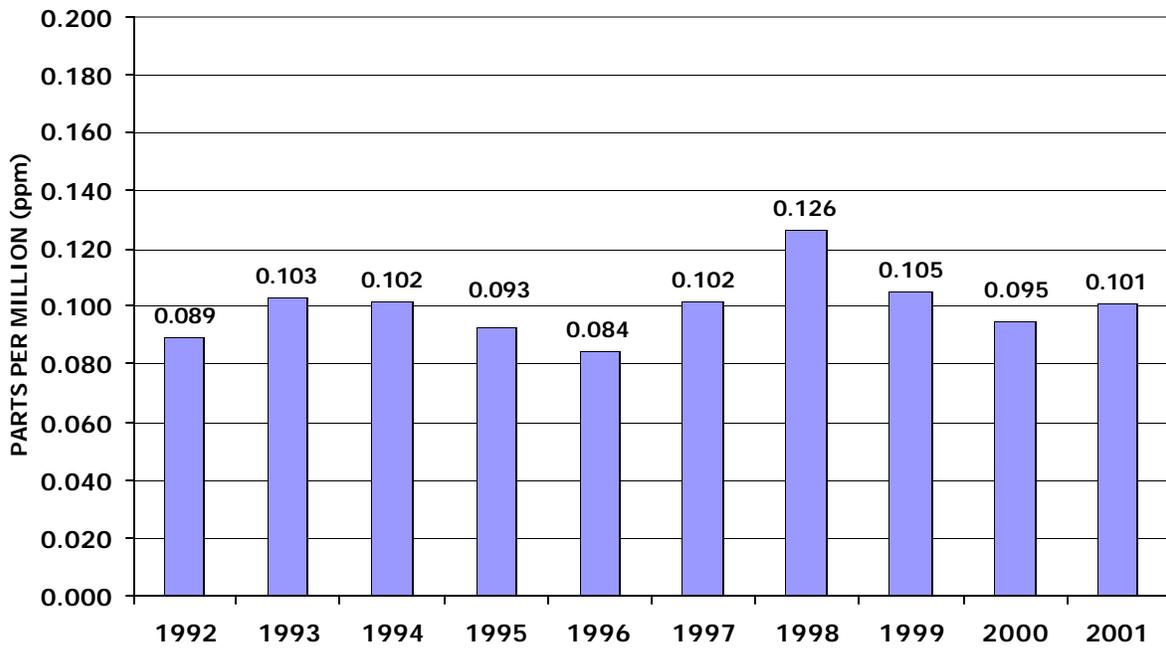
**OZONE, SOUTHWEST REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**16-B, Rural Retreat, Wythe County**



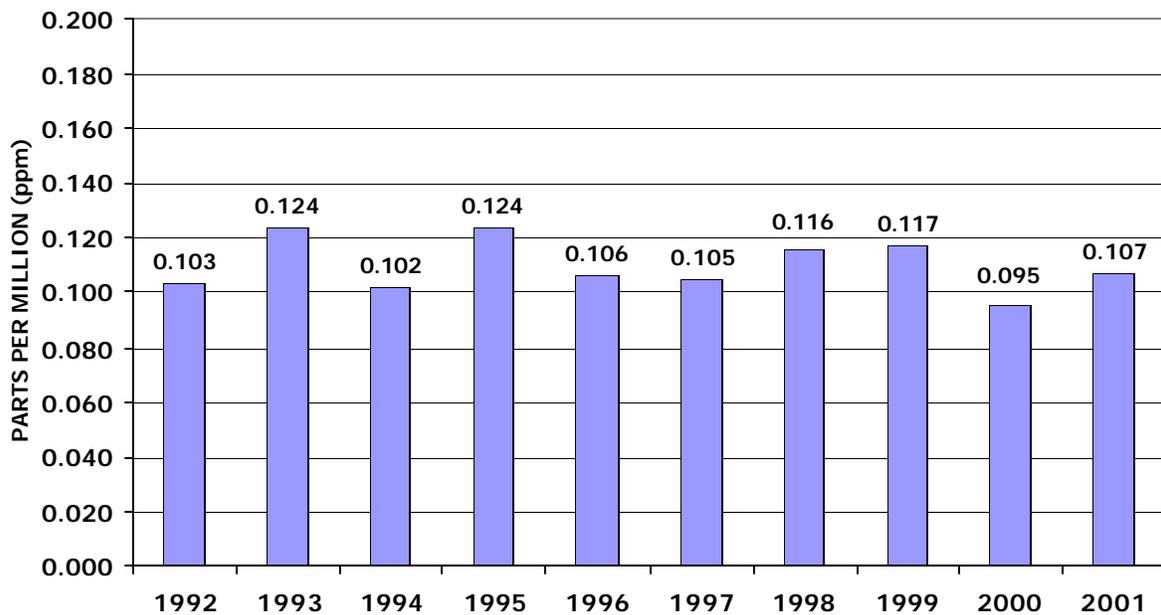
**OZONE, VALLEY REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**28-J, Rest, Frederick County**



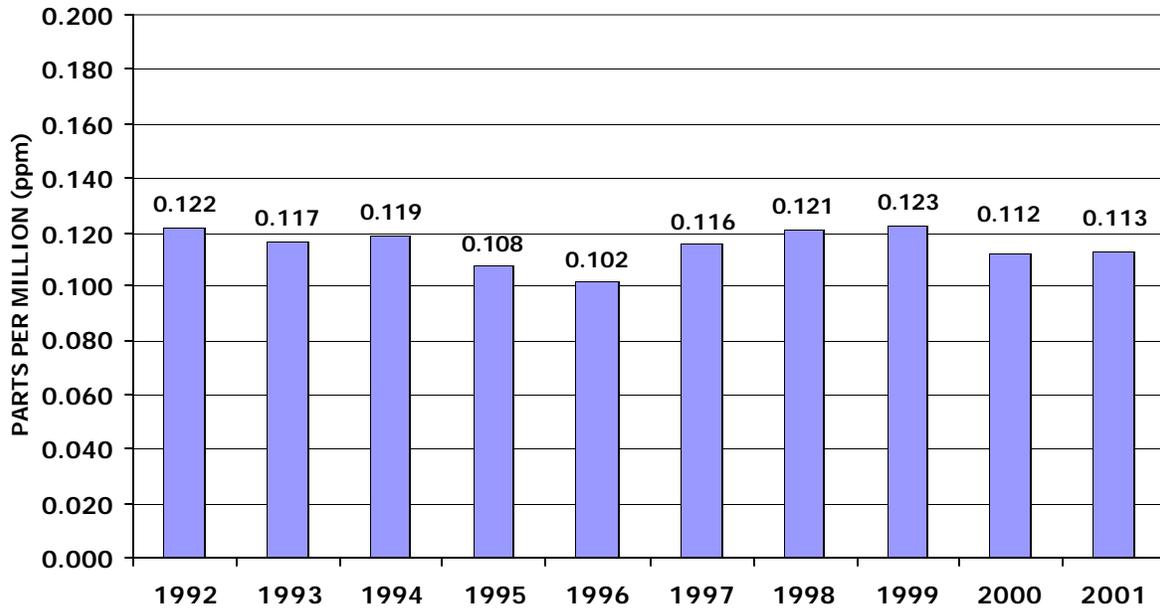
**OZONE, WEST CENTRAL REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**19-A6, Vinton Elementary School, Vinton**



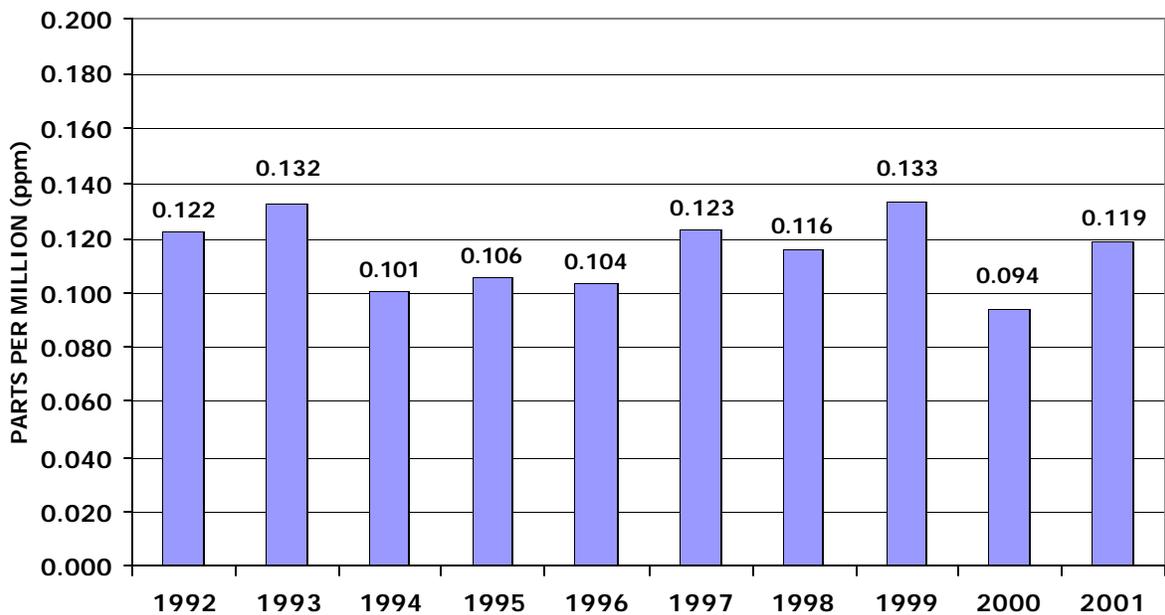
**OZONE, PIEDMONT REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**71-H, Beach Road, Chesterfield County**



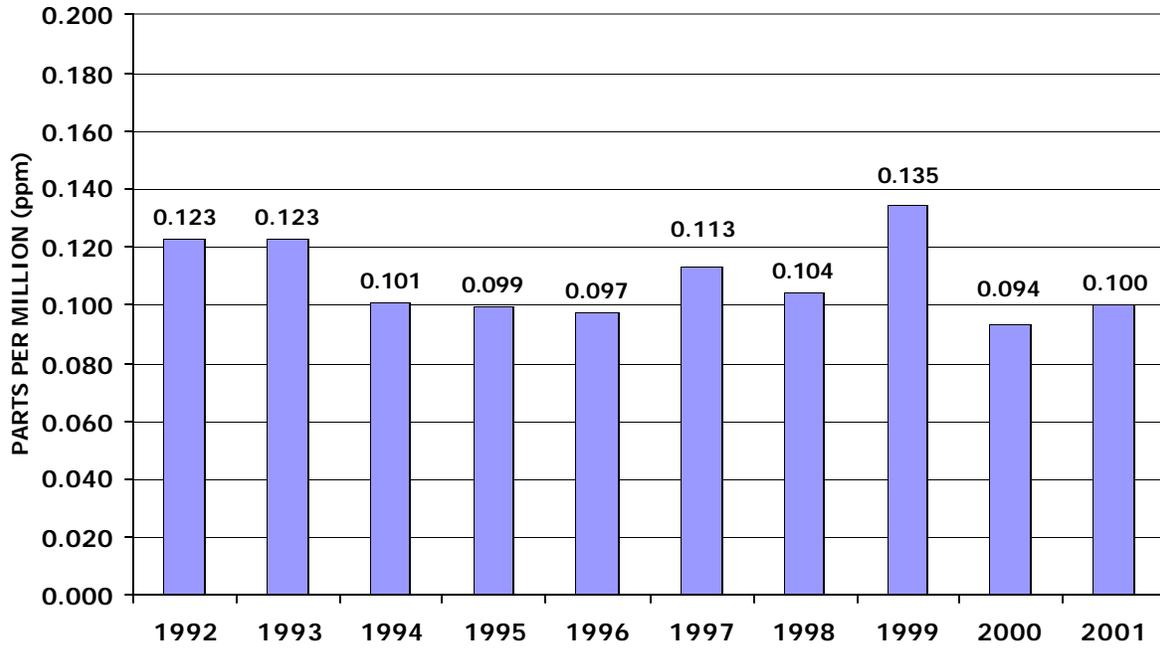
**OZONE, PIEDMONT REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
72-M, Math & Science Center, Henrico County



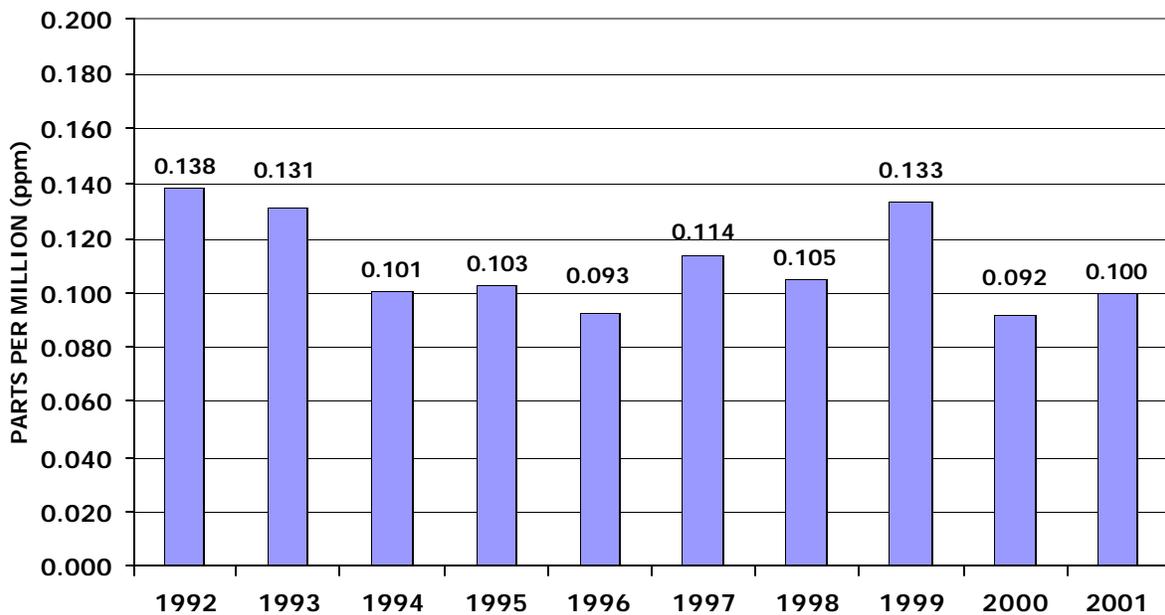
**OZONE, PIEDMONT REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
75-B, Route 608, Charles City County



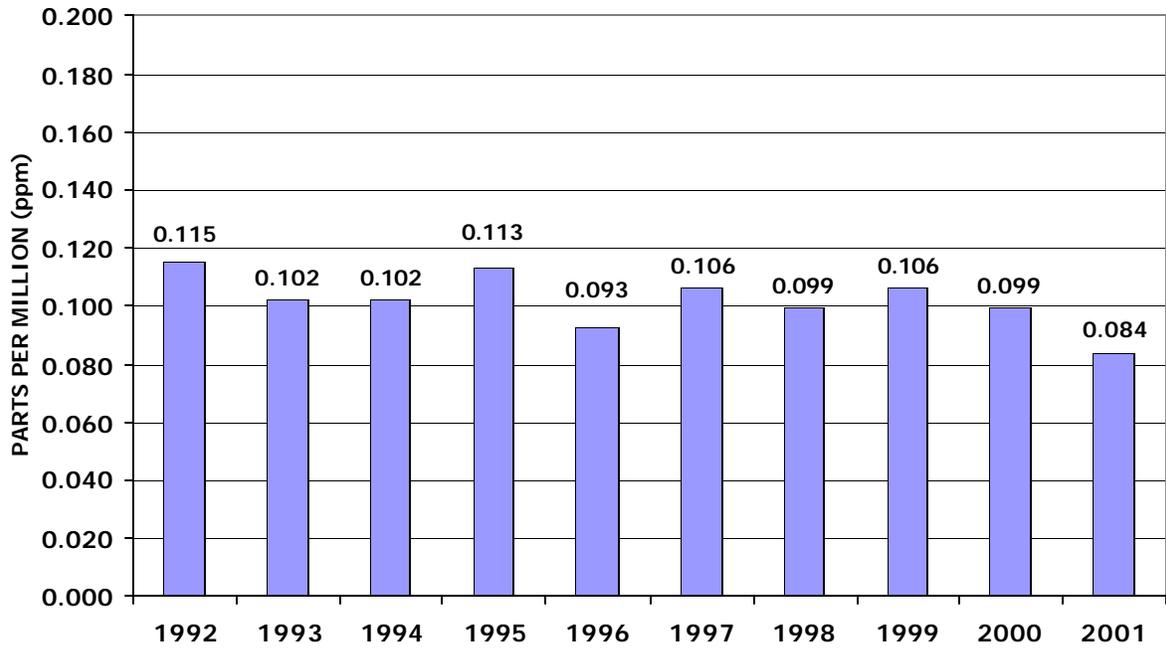
**OZONE, TIDEWATER REGION  
2ND DAILY MAXIMUM, 1-HOUR VALUE  
179-C, Virginia School, Hampton**



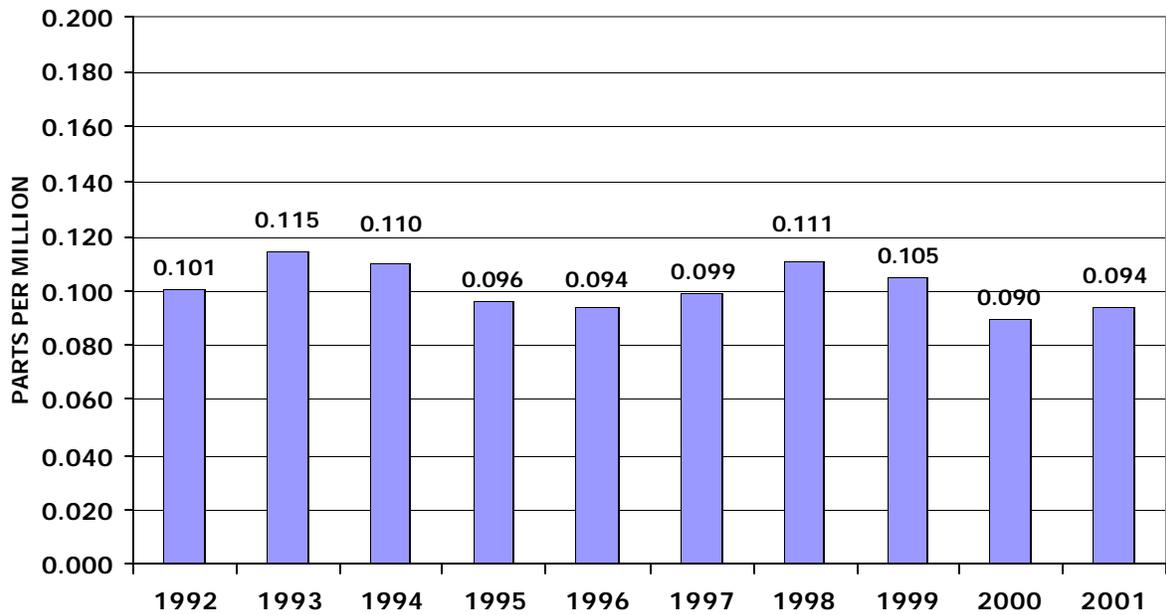
**OZONE, TIDEWATER REGION  
2ND DAILY MAXIMUM, 1-HOUR VALUE  
183-E, Tidewater Community College, Suffolk**



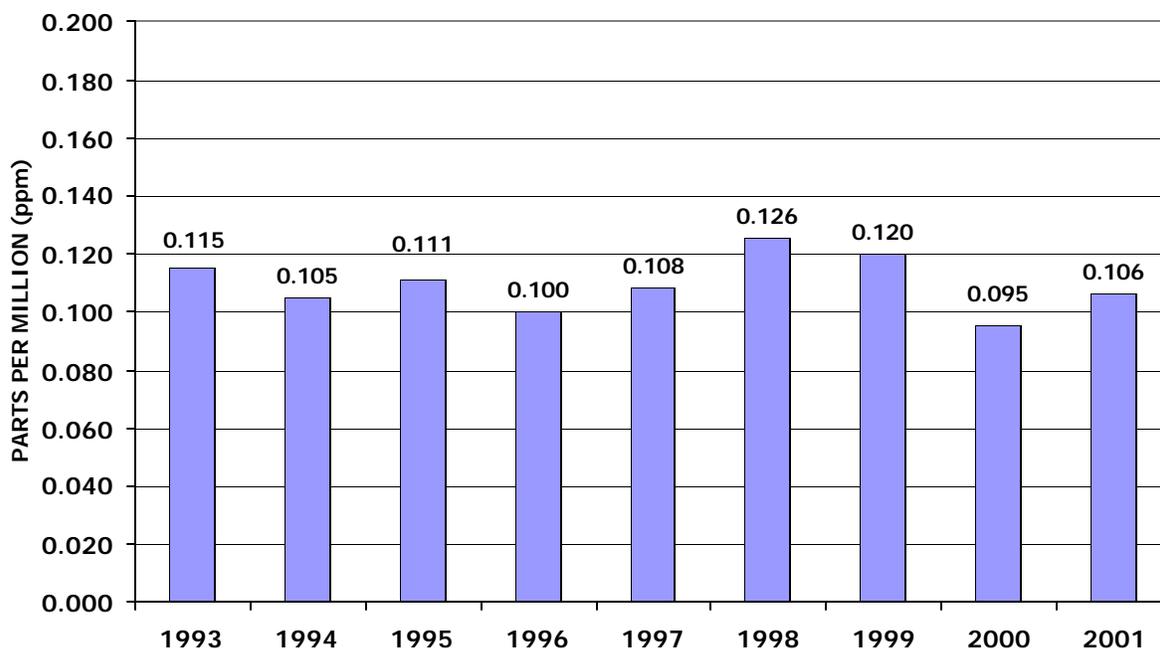
**OZONE, TIDEWATER REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**183-F, Holland, Suffolk**



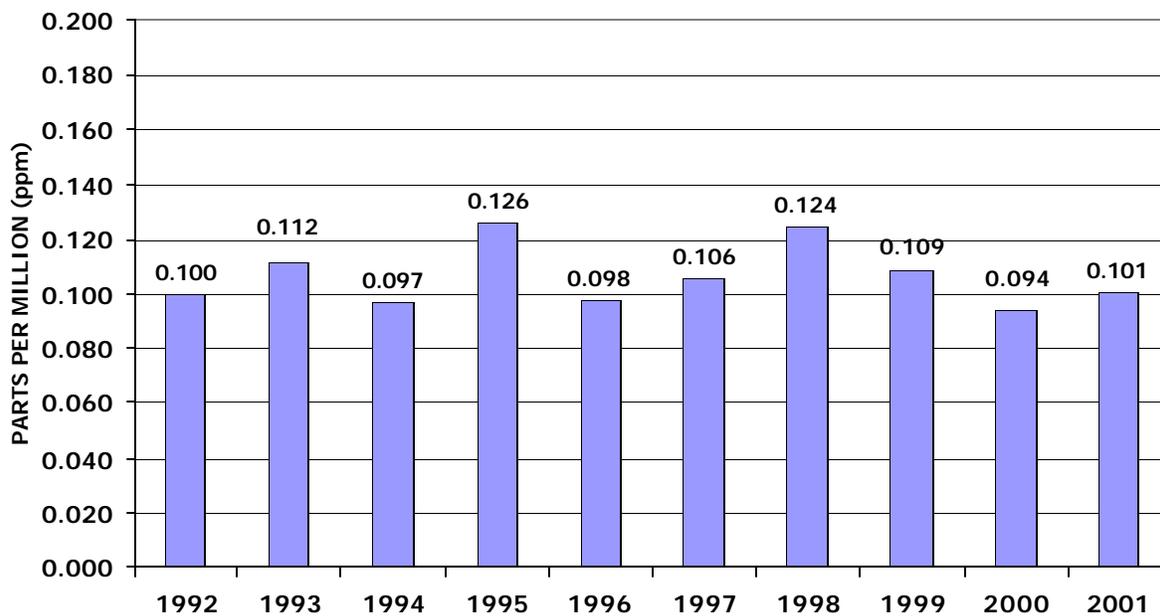
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**37-B, Phelps Wildlife Area, Fauquier County**



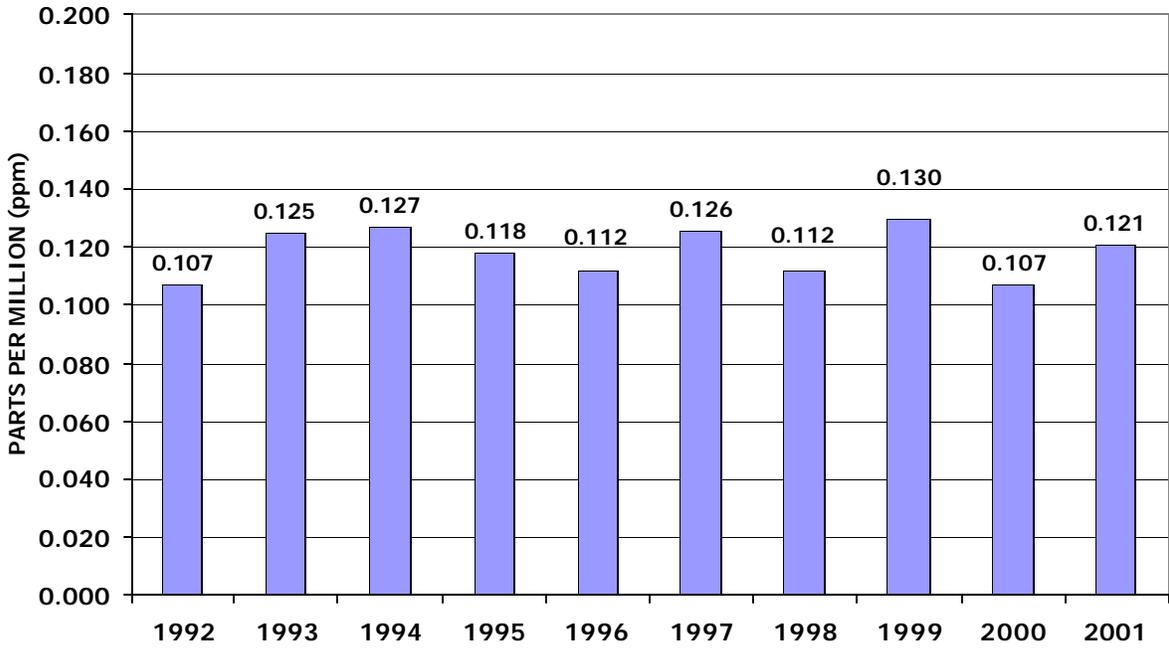
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
44-A, Widewater Elementary School, Stafford County



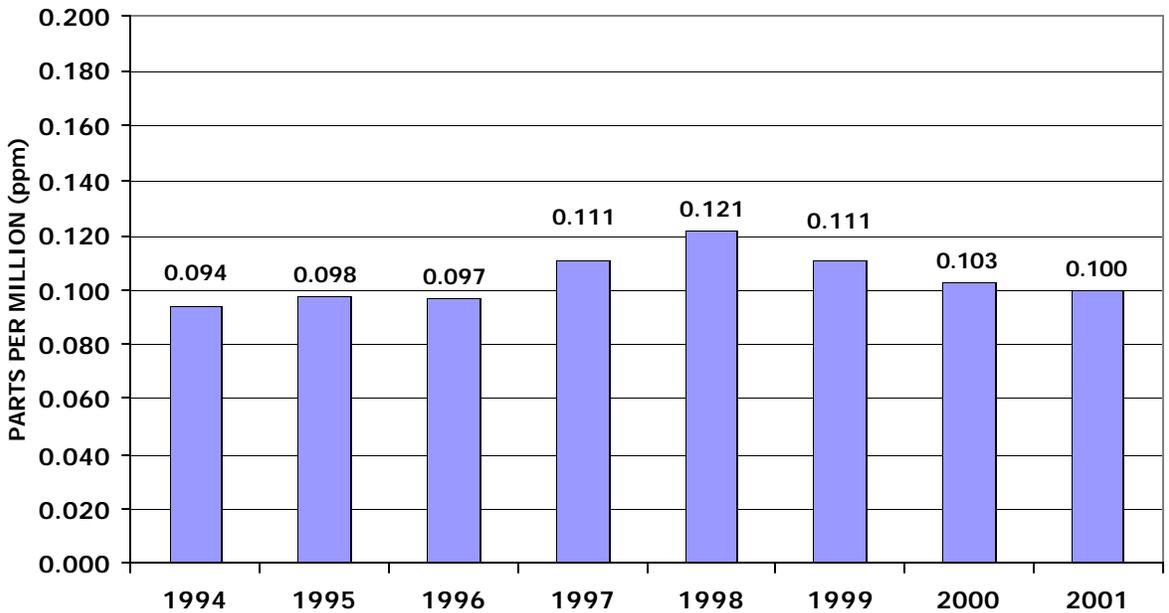
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
45-L, Long Park, Prince William County



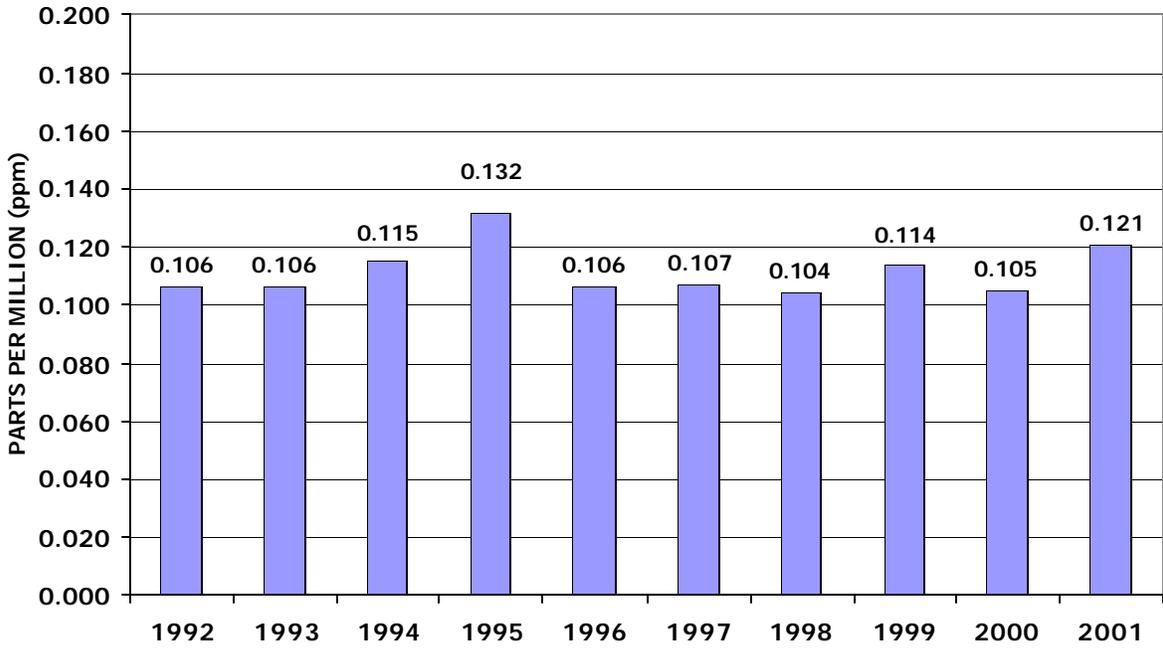
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
47-T, Aurora Hills Visitors Center, Arlington County



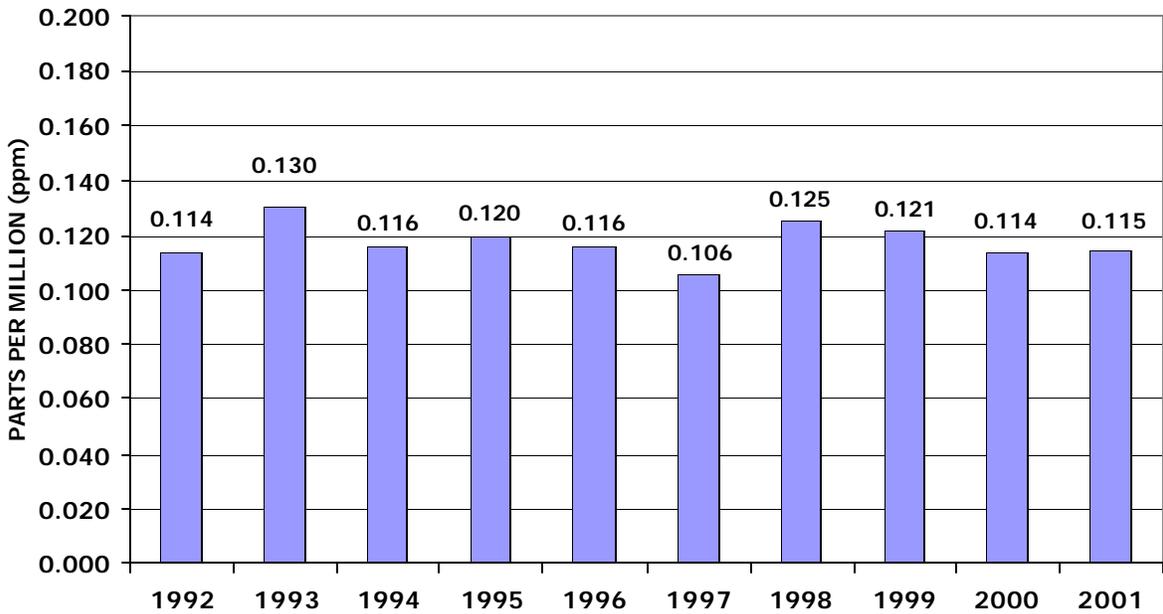
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
48-A, U.S.G.S. Geomagnetic Center, Corbin



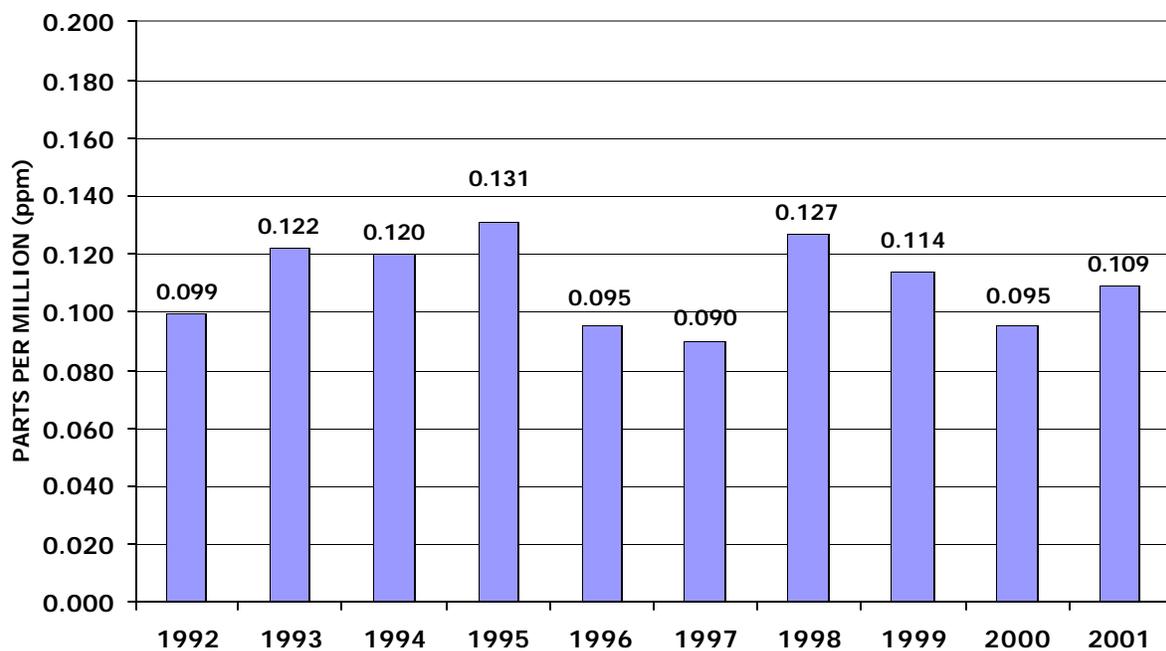
**OZONE, FAIRFAX COUNTY**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**L-46-A8, 1437 Balls Hill Road, McLean**



**OZONE, FAIRFAX COUNTY**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**L-46-B3, 2675 Sherwood Hall Lane, Mt. Vernon**



**OZONE, FAIRFAX COUNTY**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**L-46-F, Upper Cub Run Drive, Chantilly**



**2001 VIRGINIA  
OZONE EIGHT YEAR TREND  
NUMBER OF DAYS WITH 1-HOUR AVERAGE CONCENTRATIONS > 0.12 ppm**

REGION/LOCATION	STATION NUMBER	199	199	199	199	199	199	200	2001
		4	5	6	7	8	9	0	
<b>SOUTHWEST REGION</b>									
WYTHE CO., Sewage Disposal Plant	16-B	0	0	0	0	0	0	0	0
<b>VALLEY REGION</b>									
ROCKBRIDGE CO., Natural Bridge Ranger Station	21-C	--	--	--	--	--	0	0	0
REST, Lester Building Systems	28-J	0	0	0	0	0	0	0	0
PAGE CO., Luray Caverns Airport	29-D	--	--	--	--	--	0	0	0
<b>WEST CENTRAL REGION</b>									
VINTON, East Vinton Elementary School	19-A6	0	0	0	0	2	0	0	0
<b>PIEDMONT REGION</b>									
CHARLES CITY CO., Route 608	75-B	0	0	0	1	1	5	0	0
CHESTERFIELD CO., Beach Road	71-H	0	1	0	0	0	0	0	0
HENRICO CO., Math & Science Center	72-M	0	1	0	1	1	1	0	1
HANOVER CO., McClellan Road	73-E	--	--	--	--	--	--	--	0
<b>TIDEWATER REGION</b>									
HAMPTON, Va. School for the Deaf & Blind	179-C	0	0	0	0	0	3	0	0
SUFFOLK, Tidewater Community College	183-E	0	0	0	0	0	3	0	1
SUFFOLK, Tidewater Research Station	183-F	0	0	0	0	0	0	0	0

**2001 VIRGINIA  
OZONE EIGHT YEAR TREND  
NUMBER OF DAYS WITH 1-HOUR AVERAGE CONCENTRATIONS > 0.12 ppm**

REGION/LOCATION	STATION NUMBER	1994	1995	1996	1997	1998	1999	2000	2001
<b>NORTHERN REGION</b>									
<b>FAUQUIER CO.</b> , Phelps Wildlife Area	37-B	0	0	0	0	0	0	0	0
<b>LOUDOUN CO.</b> , Broad Run High School	38-I	--	--	--	--	0	0	0	0
<b>STAFFORD CO.</b> , Widewater Elementary School	44-A	0	0	0	0	2	1	0	0
<b>PRINCE WILLIAM CO.</b> , Long Park	45-L	0	2	0	0	1	0	0	0
<b>FAIRFAX CO.</b> , Lee District Park	46-B9	--	--	--	--	0	1	0	0
<b>ARLINGTON CO.</b> , Aurora Hills Visitors Center	47-T	3	1	0	2	0	2	0	0
<b>CAROLINE CO.</b> , U.S.G.S. Geomagnetic Center	48-A	0	0	0	0	1	0	0	0
<b>ALEXANDRIA</b> , 517 North St. Asaph Street	L-126-C	0	1	0	1	0	1	0	0
<b>FAIRFAX COUNTY</b>									
<b>FAIRFAX CO.</b> , McLean Governmental Center, 1437 Balls Hill Road	L46-A8	1	2	0	0	0	1	0	1
<b>FAIRFAX CO.</b> , Mt. Vernon Fire Station, 2675 Sherwood Hall Lane	L-46-B3	0	1	1	0	2	1	1	0
<b>FAIRFAX CO.</b> , Upper Cub Run, Chantilly	L-46-F	1	2	0	0	2	0	0	0
<b>TOTAL</b>		<b>8</b>	<b>12</b>	<b>1</b>	<b>8</b>	<b>15</b>	<b>24</b>	<b>1</b>	<b>3</b>

## 2001 OZONE 1-HOUR AVERAGE CONCENTRATIONS > 0.12 PPM

REGION	STATION	LOCATION	EXCEEDANCE VALUE PPM	DATE	TIME (EST)
Piedmont	72-M	<b>HENRICO CO.</b> , Math & Science Ctr.	0.136	8/8/01	4:00 pm
Tidewater	183-E	<b>SUFFOLK</b> , Tidewater Community Coll.	0.132	6/29/01	11:00 am
Northern	L-46-A8	<b>FAIRFAX CO.</b> , (Lewinsville) McLean Government Center	0.127	6/20/01	2:00 pm

## **References**

Code of Federal Regulations - 40 CFR 58 - Appendix F

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"Guideline for the Interpretation of Air Quality Standards"  
U.S. Environmental Protection Agency  
Office of Air Quality Planning and Standards  
Research Triangle Park, N.C. 27711, OAQPS No.1.2-009

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Research Triangle Park, N.C.  
T. C. Curran  
PB-292 271  
January 1979

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Quality Assurance Handbook for Air Pollution Measurement Systems  
Environmental Protection Agency

Quality Assurance Manual for Air Pollution Measurement Systems  
Commonwealth of Virginia  
Department of Environmental Quality

Air Pollution Training Institute  
Introduction of Environmental Statistics  
Statistical Evaluation Methods for Air Pollution Data  
Atmospheric Sampling